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ABSTRACT

This technical report provides an updated assessment of the problem of optimizing the periodicity of the Schools and Staffing Survey (SASS). Making use of data from three rounds of SASS data collection (for school years 1987-88, 1990-91, and 1993-94), the report extends and updates the preliminary findings and interim assessments that were previously published in a paper for the American Statistical Association (D. Ghosh et al., 1994) and a technical report for the National Center for Education Statistics (NCES) (D. Ghosh et al., 1995). Part I of the report (Sections 1 through 6) presents the analysis and findings, while Part II provides documentation and numerical results in terms of error projections for selected models, policy variables, cost rations, and periodicities. Basic results are provided for four probable error models. Section 1 provides an overview of the report and characterizes the general task of optimizing the periodicity of the SASS as one of identifying decision rules that will result in the selection of intersurvey time intervals and survey sample sizes that are in some sense "jointly optimal subject to a known, fixed set of cost constraints." While the first three rounds of the SASS were conducted at 3-year intervals, budget constraints meant that the next round was delayed to 5 years later. Section 2 covers the main modeling and analysis features of this study, while section 3 provides a brief review of time series methodology in relation to the periodicity problem. Section 4 sets forth summary conclusions and recommendations, concluding with the suggestion that the NCES should consider adopting an alternating large and small sample design for the SASS with an appropriate full-sample periodicity (such as 6 years) together with a mid-period fractional-sample data collection at the halfway time between full sample data collections. Section 6 provides an extensive bibliography for the whole report. Part II has four sets of detailed appendix tables. Appendix A provides large-sample scenarios for public schools and four states; Appendix B provides an alternating large and

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small sample design. Appendix C provides similar scenarios for private schools, and Appendix D provides an alternating large and small sample design for private schools. (Contains 2 figures, 8 tables, and 54 references.) (SLD)

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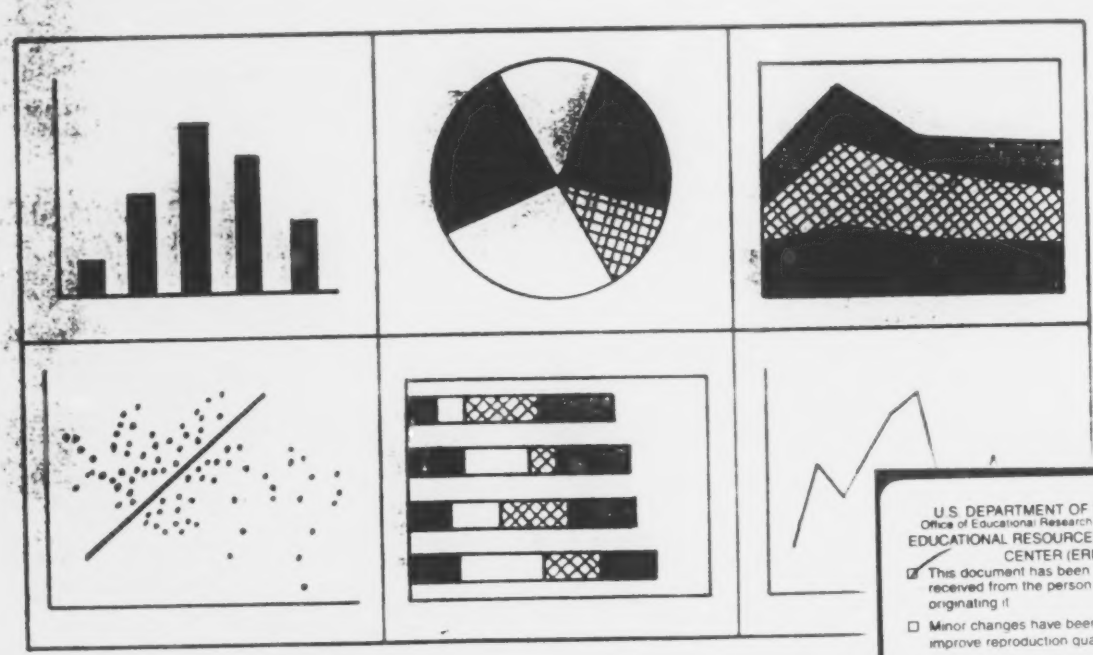

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Optimal Choice of Periodicities for the Schools and Staffing Survey: Modeling and Analysis

Working Paper No. 97-14 April 1997

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April 1997

Foreword

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Prepared for:

U.S. Department of Education
Office of Educational Research and Development
National Center for Education Statistics

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Executive Summary

This technical report provides an updated assessment of the problem of optimizing the periodicity of the Schools and Staffing Survey (SASS). Making use of data from three rounds of SASS data collection (for school years 1987-88, 1990-91, and 1993-94), the report extends and updates the preliminary findings and interim assessments that were set forth in an American Statistical Association proceedings paper [Ghosh *et al.*, 1994] and in a previous technical report prepared for the National Center for Education Statistics [Ghosh *et al.*, 1995].

Part I of this report presents the analysis and findings, while Part II provides documentation and numerical results in terms of error projections for selected models, policy variables, cost ratios and periodicities. Basic results are provided for four "probable error" models, designated as Models 1, 2A, 3A, and 4M. Model 1 was developed in a previous study and Models 2A and 3A were derived from similar prior models. Model 4M combines elements from two prior models. Additional results are provided using two of the four models, namely Models 3A and 4M, that behave in a consistent but not identical manner over various scenarios and designs.

Section 1 provides an overview of the report and characterizes the general task of "optimizing the periodicity of SASS" as one of identifying decision rules that will result in the selection of intersurvey time intervals and survey sample sizes that are in some sense "jointly optimal subject to a known, fixed set of cost constraints." While SASS was conducted at three-year intervals for the first three rounds of the survey, budget constraints have led to a delay of the next round of data collection to school year 1998-99, which is five years after the last round in 1993-94. NCES has asked the research team for the present study to consider the effect of periodicities of 4, 5, or 6 years and variable-to-fixed cost ratios of 30:70, 40:60, 50:50, 60:40, and 70:30 under a fixed total cost constraint roughly equivalent to the total cost of the 1993-94 SASS round. Section 1 also provides an overview of the concepts of direct survey costs (fixed and variable) as well as the imputed costs of "not knowing" – that is, the penalty (whether or not reduced to dollar terms) that a data user may incur as a result of using out-of-date data. Section 1 concludes with a brief review of the first three rounds of SASS.

Section 2 covers the main modeling and analysis features of the present study, which has focused on the use of probable error models as decision support tools in the optimal choice of survey periodicities. Cost models with fixed and variable costs are described in relation to the assumption of fixed total (annualized) resources. Different choices of periodicities and other design features will then spend these resources in different ways. There is a detailed discussion of the extensions to the family of probable error models that had been developed in an earlier study. Statistical formulas are provided to generate the year-to-year evolution of the projected absolute errors under each of the four models and the cumulative, multi-year average effect for each model. The projected absolute errors are a combination of the sampling error (sampling absolute error) at each survey data collection time and the error resulting from the unobserved changes in the underlying processes (changes in school and teacher variables) between survey data collections. The modeling results were generated by applying SASS data for a selection of policy variables (seven for public schools, four for private schools, and one for public and private schools combined).

There is a detailed review of the numerical results for large-sample scenarios, with emphasis on Models 3A and 4M, for both public schools and private schools. There are some fifteen scenarios in all, resulting from pairwise combinations of five possible variable-to-fixed cost ratios and of

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three different periodicities (four, five, or six years). The effect of different cost ratio assumptions on the projected errors was not large, with average relative projected absolute errors varying only plus or minus 10 per cent from reference values at a 50:50 cost ratio to values for 30:70 and 70:30 cost ratios. Tables and graphs for public schools included in section 2 highlight the conclusion that shorter periodicities (even though they involve smaller sample sizes) are uniformly better than longer periodicties at the national level. For State level public school data, longer periodicities (which have larger sample sizes) are somewhat preferable, based on the results for California, Iowa, and New York.

As an alternative to the "fixed design" of the large-sample scenarios; that is, a fixed set of sample sizes repeated at fixed intervals of four, five, or six years, a novel alternating large-and-small-sample design was formulated and tested. The specific alternating design takes the sample sizes that would otherwise have been used in the fixed design with a five-year periodicity and carries out a large-sample data collection every six years. It then uses the resulting resource savings to conduct a fractional-sample (specifically, a one-fifth size sample) data collection three years after each of the large data collections. The results of the Alternating Design compared to the Fixed Design are discussed further in section 4. Section 2 concludes with a discussion of the uses and limitations of currently available probable-error modeling methods.

Section 3 of the report provides a brief review of time series methods in relation to the periodicity problem. The early work of Scott, Smith, and Jones in the 1970s on time series methods for the analysis of repeated surveys is reviewed briefly. The relations between exponential smoothing models (applicable to random walk processes) and Kalman filter or state space approaches are outlined as a basis for a discussion of W. Smith's 1980 development of an equivalent sample size form of the Kalman filter and its application to random walk models of repeated surveys. Section 3 reports on an inconclusive attempt to apply methods for replicated autoregressive processes to assess the possible dependence of components observed in the SASS periodic series , but unobserved in NCES's Common Core of Data (CCD) series, on the observed components in the annual CCD series. A theoretical formulation was made, but available test data sets were not adequate to the planned analyses. Section 3 concludes with an analysis of the uses and limitations of time series modeling approaches.

Section 4 sets forth summary conclusions and recommendations. A discussion of lessons from probable error modeling and time series approaches reinforces a number of findings described in section 2. Projected absolute errors are relatively insensitive to cost ratios over the specified range of variable-to-fixed cost ratios (from 30:70 to 70:30). Shorter periodicities, even though they involve smaller sample sizes, are better in terms of lower projected errors for national estimates. For State-level estimates (public schools only), longer periodicities are slightly better.

Section 4 concludes with a recommendation "...that the National Center for Education Statistics should consider adopting an Alternating Large-and-Small-Sample Design for SASS with an appropriate full-sample periodicity (such as six years) together with a mid-period fractional-sample data collection to be conducted half way between the full-sample data collections. The mid-period data collection would provide a periodic update at the national level and for the larger States."

Section 5 is a technical supplement providing supplementary information which further describes the theoretical and empirical basis for some of the topics and analyses presented in earlier sections of the report. Theoretical detail is provided on the equivalent sample size form of the Kalman filter and it application to random walk models of repeated surveys. This supplements the description in

section 3.2. A formulation of a Markovian state-space model to support the composite modeling and estimation of policy variables through the joint use of CCD and SASS data is provided. This supplements the description in section 3.3.

Section 6 provides an extensive bibliography for the report as a whole.

Part II contains four sets of detailed appendix tables of projected absolute errors for public and private schools and for large-sample scenarios and for the alternating large-and-small-sample designs. Appendix A provides large-sample scenarios for public schools at the national level (U.S.) and for the States of California, Iowa, and New York. Appendix B provides an alternating large-and-small-sample design for public schools at the same geographic levels. Appendix C provides large-sample scenarios for private schools (national level only) and Appendix D provides an alternating large-and-small-sample design for private schools (national level only).

* * *

This report was prepared at Synectics for Management Decisions by Wray Smith, Dhiren Ghosh, and Michael Chang, with the assistance of S. Bhalla, M. Hu, and M. Saba.

* * *

KEY WORDS: Absolute error modeling; Data deterioration; Fixed and variable costs; Optimization; Repeated surveys; Time series modeling

Part I – Analysis and Findings

1. Introduction and Outline of Research Problems Addressed

1.1 Overview

This report updates an interim assessment presented in a proceedings paper (Ghosh *et al.*, 1994) and in a technical report (Ghosh *et al.*, 1995) of our previous study of methods and criteria in support of optimizing the periodicity of the Schools and Staffing Survey (SASS). The term "optimizing the periodicity of SASS" is intended to include any procedures that will result in selecting an intersurvey time interval and a survey sample size that are in some sense jointly optimal subject to a known, fixed set of cost constraints.

The National Center for Education Statistics (NCES) has an ongoing agreement with the Bureau of the Census under which the bureau carries out the periodic collection of SASS data. There have now been three cycles of SASS data collection, spaced at three-year intervals, and a fourth cycle is now tentatively scheduled to take place five years after the third cycle. The programmatic justification for the ongoing cycle of data collections that make up the SASS survey system lies in the fact that SASS collects jointly analyzable school-level data on a variety of variables that are relevant to educational research and policy analysis. Such variables have to do with school and teacher (and pupil) characteristics and provide detail that is not available from the annual data on public schools compiled through the Common Core of Data (CCD) system. Among the detailed measures provided by SASS are estimates of teacher qualifications and turnover by subject area, teacher and administrator compensation, and ethnic composition of students as well as faculty. In the case of public schools and for most variables, it is NCES's goal that useful estimates may be made for individual States as well as for different degrees of urbanicity across States. In the case of private schools, NCES produces U.S. national-level estimates and does not produce State-by-State estimates.

SASS was conducted with a periodicity (intersurvey interval) of three years for the first three data collection cycles of this ongoing repeated survey. The first study was conducted pursuant to Subtask 20B.3 under Task Order No. 20 (SASS Evaluation) of the U.S. Department of Education technical assistance contract with Synectics for Management Decisions, Inc. (Contract No. RN910600.01) in support of the National Center for Education Statistics (NCES). The starting point specified by the statement of work for that subtask was a paper that appeared in the *Journal of Economic Dynamics and Control* (Smith and Barzily, 1982). That paper was based on W. Smith's dissertation research (Smith, 1980) regarding the optimal choice of sample size and intersurvey time intervals for repeated socioeconomic surveys. The first study considered the relevance and potential applicability of previous work by W. Smith and others to the problem of optimizing the periodicity of SASS. It then developed and presented an alternative procedure for making an optimal choice of periodicity based on an approach suggested by D. Ghosh which utilizes "probable error" models. The second study extends the work carried out in the first study, both in its theoretical and applied aspects. In particular, the second study has examined and refined five probable-error models and has considered periodicities of 4, 5, or 6 years. In addition, it has considered a set of specified scenarios for different proportions of variable cost to fixed cost—specifically, 30:70, 40:60, 50:50, 60:40, and 70:30. These proportions determine the amount available for the variable cost which, in turn, determines the size of sample that can be supported for each survey.

For the purposes of both studies the "optimal choice" of periodicity for SASS is assumed to be made in a conceptual framework that provides a means of taking into account the fixed and variable costs of operating a system of repeated surveys and the imputed costs resulting from the use of out-of-date estimates by public and private data users. The framework assumes that data collected annually (and processed with no delay) would represent the benchmark against which less frequent data collections (and lengthy processing times) would be compared in terms of data quality and cost. With the passage of time (due both to the choice of intersurvey interval and to data processing delays), estimates of variables of interest are assumed to have an increasing degree of uncertainty (error). The framework assumes that this growth in the estimation error can be quantified and that a resulting "cost" to the data user can be characterized. The goal, within this cost-and-error framework, is to select an intersurvey interval and a survey sample size that are jointly optimal.

The current SASS series, with the Census Bureau as the collection agent for NCES, has now been conducted for school years 1987-88, 1990-91 and 1993-94. Other data sources, primarily the Common Core of Data (CCD) annual data collection, provide basic information for public schools on the number of schools (by type and grade levels), the number of teachers, and enrollments. SASS is a supplemental survey system designed "to measure the critical aspects of teacher supply and demand, the composition of the administrator and teaching work force, and the status of teaching and schooling generally." Although the first three cycles of the series have been collected at three-year intervals, the frequency of data collection is not mandated by statute or departmental regulation. Tradeoffs between different periodicities (such as 4, 5, or 6 years) and corresponding sample sizes will now be subject to technical, policy, and budgetary review in NCES.

There is an extensive literature on the analysis of repeated surveys which has developed over the past twenty years, primarily through the work of British and American statisticians. Section 3 of the present report includes a brief review of currently available time series methods for the analysis of repeated surveys and pertinent citations are included in the Bibliography section. Some connections between and among classical exponential smoothing, Box-Jenkins time series modeling, Kalman filtering, state-space models, and signal extraction are outlined. The discussion recognizes the limitations of conventional modeling techniques and points out the possible need to accommodate level-dependent variances and perhaps other state dependencies in the modeling of schools and staffing survey data.

Although both the first and second study depend in part on the prior work in Smith (1980), Smith and Barzily (1982), and Smith and Zalkind (1978), the Smith-Zalkind-Barzily optimization tools are not a fundamental basis for either of the two studies. The S-Z-B modeling approach is not directly applicable to short duration time series with possibly time varying variance-covariance matrices. Nonetheless, the S-Z-B approach has provided a useful conceptual framework for the two studies and is incorporated in principle in one of the probable-error models (Model 4M) utilized in the present study.

One of the present authors (D. Ghosh) is credited with formulating a family of "probable-error" models for use as a decision support tool in identifying optimal or near-optimal periodicities. The basic models and their extensions are summarized in section 2. The models are capable of recognizing the fixed and variable costs of repeated surveys and of minimizing average error ("projected absolute error") as a function of intersurvey time intervals (periodicity) and sample sizes. The analyses start with the assumption that total (multi-year) resources are fixed and that the

problem is to determine the best periodicity for the survey series in the light of average projected absolute error incurred over a multi-year cycle of repeated surveys.

In the first study a 12-year cycle with intersurvey intervals of 2 years, 3 years, and 4 years was analyzed. Model 1 and two other models were then applied to each case. The model testing involved the selection of twelve different items ("policy variables") that were part of the SASS data for the 1987-88 and 1990-91 cycles of data collection. The 1993-94 data were not available at the time the first study was conducted, but have been utilized in the conduct of the second study. Tables were presented in the 1995 technical report which displayed the "total average error incurred in a 12-year cycle" for each of the selected variables under Models 1, 2, and 3 with periodicities of 2, 3, and 4 years. The fourth model, which was a variation of the S-Z-B approach, provided meaningful results for only three of the eleven variables. The assumptions for survey costs for the purposes of the previous study were described in section 5 of the 1995 report. Under the assumed total resource constraint, the resulting sample sizes were 8,667 for a 2-year interval, 13,000 for a 3-year interval, and 17,333 for a 4-year interval. Under the cost assumptions, a 2-year periodicity was determined to be optimal under Models 1, 2, and 3. As noted in the body of the 1995 report, this optimality determination was based on minimizing total average error, subject to the stated cost constraints, for national-level data. It did not address the impact on State-level estimates. It is therefore important to assess any impact on State-level estimates since NCES intends to maintain its ability to publish directly estimated State-level figures for most SASS variables. The possibility of utilizing indirect estimates, such as estimates from time series models, is currently only of theoretical interest. There are no present plans for implementing such estimates.

The present technical report ("1996 report") includes empirical results for public schools for three sets of State-level data. A preliminary analysis is provided for assessing the impact on State-level estimates of, for example, a decrease in overall U.S. sample size from approximately 9,000 to 7,200 in moving from a projected five-year periodicity to a four-year periodicity. These particular hypothetical, but plausible numbers, arise from an analysis at the mid-point of a set of specified scenarios for different ratios of variable cost to fixed cost; that is, if the ratio of variable to fixed costs were 50:50 and a national sample of approximately 9,000 public schools could be supported under a five-year periodicity, then a four-year periodicity could only afford to sample approximately 7,200 public schools.

For each of four probable-error models we have assumed that the total resources are fixed and periodicities of four, five, and six years were considered. As noted in the work statement for Task 46, the "alternatives assume that the fixed cost bears a constant relationship to the variable cost." As required by the task statement, we have considered the following different proportions of variable cost to fixed cost: 30:70, 40:60, 50:50, 60:40, and 70:30. Variable cost determines the total sample size for each round of SASS for each of the periodicities specified. Based on cost information from NCES, we have assumed an approximate total sample size of 9,000 for public schools and 2,500 for private schools for the five year periodicity when the variable cost is at the mid-point of the range, namely, at 50 per cent of total cost. This basic assumption fixes the sample sizes for all other cases because of the simple proportionality over all of the scenarios.

The family of models developed assumes that the true value of a variable remains constant for a year after the survey date. The variable undergoes a change at the end of each year. The magnitude of this change is denoted by $|D|$. The sampling error component is the sampling absolute error, $sae(n)$, which is a function of the sample size n.

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In Model 1, we ignore the direction of the change in the value and just add the probable error to the successive changes in the true value. In Model 2A, we take into account all the possibilities and calculate the expected values over all the possibilities. For each successive year we calculate the expected value over all the projected possible values. In Model 3A, we assume the year-to-year process change to be a normal random variable with a nonzero mean.

The projected absolute error is then calculated from a variable that combines the process change and the sampling error. In Model 4M, we explicitly assume that the process change which occurs each year is a Random Walk process in discrete time. Numerical results for public schools under Models 1, 2A, 3A, and 4M are set forth in Appendix A (for large-sample scenarios with periodicities of 4, 5, or 6 years) and in Appendix B (for an alternating large-and-small-sample scenario with a large-sample data collection every 6 years and a small-sample data collection 3 years later) for public schools under Models 3A and 4M.

1.2 Direct and Imputed Costs in the Choice of Survey Periodicity

Any formalization of the problem of seeking an "optimal" choice of survey interval and survey size must account for the fixed and variable costs of operating a system of repeated surveys, such as SASS, as well as imputed costs due to increasing errors in the estimates as sample size is reduced and out-of-date estimates are used. In a recent book on survey errors and survey costs, Groves (1989) provides an up-to-date review of the kinds of considerations which should go into creating cost-and-error models for surveys, with particular emphasis on household surveys. Currently there is no comparable work on cost-and-error modeling for establishment surveys or surveys of institutions such as schools.

In the case of SASS, there is an ongoing, more-or-less fixed, annual cost of maintaining the core elements of the SASS system whether or not a survey is conducted in a particular year. These ongoing costs are incurred both at the National Center for Education Statistics (NCES) and at the Bureau of the Census. Some costs might be regarded as either fixed or variable. Among these are the costs of updating list and area frames, with special emphasis on updates immediately preceding each cycle of data collection. In this report we lump such costs with the fixed annual costs of providing detailed institutional memory for all aspects of SASS (at NCES and at Census), making evolutionary design changes in coverage and content to be incorporated in the successive cycles of data collection, and conducting ongoing methodological research in support of SASS processing and estimation procedures.

We assume that the variable costs can be summarized sufficiently well in a linear cost function with a constant unit cost coefficient so that the total variable cost for each cycle is a simple multiple of the number of schools in a data collection cycle. The reality is a bit more complicated than that, but within a real-world practical range of designated sample sizes for public and for private schools, it is not unreasonable to treat the survey unit cost per school as a fixed number of dollars, with or without adjustment for inflation. It would also be possible to set up the problem over, say, a 12-year or longer time horizon as a present value problem in line with the guidance the Office of Management and Budget prescribes for capital investment projects with a life-cycle cost.

In addition to the directly measurable dollar outlays associated with maintaining and operating the SASS system, it is possible to include imputed dollar costs to represent the loss or penalty which is incurred by public and private users as a result of using outdated survey data. Smith and Zalkind

(1978), Smith (1980), and Smith and Barzily (1982) incorporated such an approach formulating an imputed loss associated with the use of imprecise estimates from an observed economic process where the objective was the allocation of public funds on the basis of such estimates. One development from this earlier work was the formulation of an "equivalent sample size" form of the Kalman filter. This is reviewed briefly in section 3 and section 5 of this report and involves a framework in which knowledge of the state of a socioeconomic process is characterized as the level of a stock of information (an equivalent sample size on hand). The original approach required a policymaker to select a scale factor or equivalence to characterize the "cost of not knowing" in dollar terms so that the imputed cost or loss can be combined in the same formulas with the dollar outlays.

1.3 Notes on the First Three Rounds of SASS Data Collection

The current SASS series, with the Bureau of the Census as the collection agent for NCES, was inaugurated for school year 1987-88 and repeated in 1990-91 and again in 1993-94. Although the first three cycles of SASS were conducted at three-year intervals, SASS has not had an officially established frequency of data collection. As a result of budgetary restrictions, the next round of SASS is currently scheduled to take place in 1998-99; that is with a periodicity of five years.

The Schools and Staffing Survey is an *overlapping survey* (see Kalton and Citro, 1993, for a classification scheme for surveys across time). For public schools the SASS design for the 1990-91 cycle provided approximately 30 per cent overlap for schools within each State with those selected in the 1987-88 cycle while using an updated list frame for the second cycle. For private schools, there was also a target degree of overlap nationally by type of private school or national affiliation.

Kaufman and Huang (1993) describe the key design and implementation aspects of the 1990-91 SASS in relation to the 1987-88 SASS. The survey is designed "to measure the critical aspects of teacher supply and demand, the composition of the administrator and teaching work force, and the status of teaching and schooling generally." The sample sizes for public and private schools and administrators, local education agencies, and teachers were approximately the same for the two cycles of SASS. The core SASS components are the "Teacher Demand and Shortage Survey", the "School Survey", the "School Administrator Survey", and the "Teacher Survey".

There were changes in SASS design from 1987-88 to 1990-91. The public school frame for 1987-88 was the QED (Quality Education Data) file and for 1990-91 was the CCD (NCES's Common Core of Data) school file. For private schools, the 1987-88 SASS used a dual-frame approach with a list frame based on the 1986 QED file and an area frame with the same primary sampling units used in the 1983 Private School Survey. For the 1990-91 SASS private school component, the 1989 Private School Survey (PSS) provided the sampling frame.

Although the total public school sample sizes were the same for 1987-88 and 1990-91 (9330 schools), the sample allocation methodology for 1990-91 differed in several respects from the methodology used for 1987-88. These changes were designed to improve the analytical usefulness of the resulting survey data sets for making estimates at the State level without doing too much harm to national estimates.

For public schools there was a controlled overlap of 30 per cent between 1987-88 and 1990-91. The QED definition was used to define the school for matching purposes at sample allocation time.

Although overlap flags are included on the 1990-91 restricted-use SASS data sets, neither the APIN number (QED identifier) nor any equivalent matching identifier appear on both the 1987-88 and 1990-91 restricted-use data sets. We could not ascertain an explanation for this discrepancy. For some desired purposes of the present study it was thus not possible to make an exact match of the overlapping public schools in any routine way. The change to the CCD definition for the public school portion of the 1990-91 SASS while using the QED definition for overlap matching purposes did result in some problems in maintaining the target sample allocation goals. The problem arises because some QED sites are the locus of more than one CCD school.

In addition to the sampling design changes there were some questionnaire content and definitional changes. The variables in the two cycles that attempt to characterize the "type of community" cannot be directly reconciled. In 1987-88 there was a self-report by administrators of community type and in 1990-91 a "locale code" based on Census "urbanicity" information on population density, SMSA codes, and urban/rural area descriptors.

The total sample size and the State-by-State sample allocations for the 1993-94 SASS differed from the 1990-91 round in only minor ways. These differences did not present any problems for the conduct of the current study. Abramson *et al.* (1996) describe the changes in SASS design from 1991 to 1994, including questionnaire and conceptual changes.

2. Probable-Error Methods as Decision Support for Choice of Periodicity

In our previous and current work, we have assumed that data users will keep on using the data obtained from the most recent past survey until a new survey is undertaken and the newly collected data are processed and released to data users. Thus, if the intersurvey period is long, "deterioration" of the data could affect the quality of decisions made by users. On the other hand, if the survey is undertaken very frequently, the costs of conducting the survey and analyzing the data and the indirect costs of the response burden may be judged to have costs that exceed the benefits achieved in using current data. In the context of repeated surveys, it is useful to distinguish both opportunities and problems presented by different designs.

Typical analyses of cost-benefit tradeoffs tend to focus on the best use of a fixed resource amount over a time period that would include two or more survey data collections. The present budgetary restrictions for the 1990s are such that the "fixed" resource amount may be arbitrarily depressed and may overconstrain any realistic formulation of the optimization problem. In fact, the "truly optimal" formulation may be precluded by external constraints.

2.1 Cost Models with Fixed and Variable Costs

The usual cost model for a sample survey assumes a start-up cost C_0 and a per unit (ultimate sample unit) cost C_1. Thus, the total cost is represented as $C = C_0 + nC_1$. However, this start-up cost may be dependent on the periodicity. We represent it as C_0^k (where k is the periodicity) which may be regarded as increasing with increasing periodicity; i.e., the start-up cost is more if the periodicity is three years compared to the start-up cost if the periodicity is two years and so on. On the other hand, the start-up cost may be considered to be constant; i.e., it does not depend on the periodicity.

In the family of statistical models that we develop below, we assume that the total resources are fixed. The different possible periodicities spend these total resources in different ways. This assumption then determines the possible sample sizes every time the survey is undertaken corresponding to different periodicities. Thus, if we are comparing two possible periodicities, say two years as against three years, we consider a six-year cycle (the least common multiple of the two periodicity numbers). In the six-year cycle, a survey with periodicity two years will be conducted three times while a survey with periodicity three years will be conducted only twice. If C_0^k and C_1 (where C_1 is assumed to be independent of the periodicity of the survey) are known (whether the start-up cost is constant or increasing), we can calculate the possible sample sizes for these two alternatives where the total measure C is also known. A modified approach would be to use similar models but to attempt to take explicit account of the fact that total resources may be arbitrarily reduced by external constraints and formulate the decision problem within that framework.

2.2 Update and Extension of a Family of Probable-Error Models

We assume that the true value of a variable remains constant for a year after the survey date. This is an appropriate assumption for the SASS survey system since nearly all of the observed variables under the various SASS questionnaires have an annual accounting period and the SASS data user is interested in changes in variables which are specified to change as of some conventional time point. For example, the official figure for enrollment and number of teachers in a public school is the fall (October) enrollment and the corresponding number of teachers or the full-time equivalent (FTE) number of teachers counted at the same point in time. The student enrollment and the teacher count may fluctuate during the academic year, but SASS and the Common Core of Data (CCD) are, in effect, taking snapshots at the same time over a sequence of years. The error incurred in using a survey estimate is exactly equal to the difference between the survey estimate and the true value. Within the twelve-month interval from the survey date any user incurs an error which equals the difference between the true value and the survey estimate. The estimated standard error of the survey estimate provides an indication of this difference. The usual definition of the standard error for a statistic based on a sample from the population is that it is the "positive square root of the variance of the sampling distribution of a statistic" (Kendall and Buckland, 1971). The survey estimate is assumed to be approximately normally distributed around the true value with a standard deviation which is the standard error of the estimate.

If one were interested in estimating from SASS data for a survey year the mean of some characteristic for a specified group of schools, such as the average "number of K-12 teachers that are new to the school this year" for all regular public elementary schools in the State of California, then the estimate would be constructed by applying the school weight for each school to the reported number of new teachers for that school, summing the products and dividing by the sum of the school weights. For some of the SASS-based public school statistics published by NCES, such as those in the publication series *Schools and Staffing in the United States: A Statistical Profile* for each round of SASS, the NCES publications include tables of State-by-State estimates of the statistics and, for a selected subset of the State-by-State statistics, they also include tables of the estimated standard errors for those statistics. For example, the *Statistical Profile* for 1990-91 includes, for public schools, both estimates of the statistics and estimated standard errors for these statistics on a State-by-State basis for (1) Number of public schools and students and average number of students per full-time-equivalent (FTE) teacher, (2) Percentage distribution of public school teachers by sex and race-ethnicity, percent minority teachers, and average teacher age, and (3) Average base salary for full-time public school teachers and average public school principal salary. As stated in the technical notes to that publication, "Standard errors were estimated using a balanced repeated replications procedure that incorporates the design features of this complex survey."

The difference between the true value and the survey estimate is the deviation from the mean m in the normal distribution of the survey estimate x considered as random variables. The average

of these deviations is called the mean (absolute) deviation. It is calculated as follows for any normal distribution:

$$\frac{1}{\sigma\sqrt{2\pi}} \int_{-\infty}^{\infty} |x - m| \exp[-(x-m)^2 / 2\sigma^2]\,dx = 0.8\sigma$$

The projected absolute error incurred by any user during the first year after the survey is just the sampling absolute error, $sae(n) = 0.8s/\sqrt{n}$ where $s/\sqrt{n}$ is the standard error of the estimate, assuming simple random sampling. At the end of each year we assume that the true value undergoes a change. The magnitude of this change at the end of each year is denoted $|D|$. The sampling error component is the sampling absolute error, $sae(n)$. So the expected value of the total error incurred by all the users is dependent on $sae(n)$ and on $|D|$. The magnitude of the change at the end of the second year is also $|D|$, and so on.

During the course of our work on periodicity conducted since 1993, the research team has explored several probable-error models (designated as Models 1, 2, 3, 4, 2A, 3A, and 4M). In addition, a time series model (designated as Model 5) was treated briefly in Ghosh *et al.* (1994). Four of the probable-error models were selected for extended analysis through the application of three rounds of SASS data. These are described below.

In **Model 1**, which was described in Ghosh *et al.* (1994), we ignored the direction of the change in the true value and just added the sampling absolute error $sae(n)$ to the successive changes D in the true value. Model 1 is "ultra conservative" or "pessimistic" in that successive changes are assumed to result in the largest possible cumulative year-to-year drift away from the last observed value.

In **Model 2A**, which is a variant of Model 2 described in Ghosh *et al.* (1994), we took into account all the possibilities and calculated the expected values over all the possibilities. The change may be positive or negative; that is, the new value may be larger or smaller than the previous year's value. We estimated the magnitude of change from the past data and used the estimate to project all possible new values. For each successive year we calculate the expected value over all the projected possible values.

In **Model 3A**, which is a variant of Model 3 described in Ghosh *et al.* (1994), we assume the year-to-year process disturbance (process error) to be a normal variable with a nonzero mean. We assume that this mean is approximated by calculating the average change from the past data. Since the process error and the sampling error are both assumed to be normally distributed, they can be readily combined. The projected absolute error, or *p.a.e.*, is then calculated from this new combined normal variable.

In **Model 4M**, which is related to both Model 4 and Model 5, described in Ghosh *et al.* (1994), we explicitly assume that the process change which occurs each year (for example, every October 1st) occurs in accordance with a Random Walk process in discrete time. In the original models we introduced the concept of a loss parameter that converted the sampling error together with the unobserved process shift in non-survey years to a loss, expressed in monetary units. The combination of average cost and average error over a period of years was minimized to determine the optimum periodicity. This was a variation on the S-Z-B approach and was also a variation on

an analysis suggested by S. Kaufman. Model 4M does away with the need for a separate loss parameter, thus avoiding the introduction of a subjective judgment on the part of the survey administrator. In Model 4M the process equation is

$$x_t = x_{t-1} + w_t$$

where w_t has mean zero. We then calculate the average error for different possible periodicities of the repeated survey. The optimal intersurvey interval can be determined if the process variance and the sampling variance are known. In a Random Walk model, the current level x_t of the process is the best current forecast for any future year. One assumes that any known trend component has already been subtracted out. In general, data users will tend to use the last available survey value as long as no new survey has been conducted. This "common sense" practice is consistent with the assumption of an underlying Random Walk process.

The following tables set forth the year-by-year evolution of the projected absolute errors for four models (Models 1, 2A, 3A, and 4M). For Models 1, 2A, and 3A the evolution is based on $|D|$, the magnitude of the annual change in the true value, and the sampling absolute error, *sae(n)*. For Model 4M, the evolution is based on D^2, assumed to be equal to the variance of the process disturbance w_t, and the sampling absolute error, *sae(n)*.

Under each of the present models, in Year 1, which is the year in which the survey is conducted, the projected absolute error is just the sampling absolute error, *sae(n)*. In Year 2 the process has exhibited a change of magnitude $|D|$. Under Model 1 the process change is simply added to the sampling absolute error *sae(n)* from Year 1 to obtain the Year 2 projected absolute error. Under Model 2A, provided $|D| > sae(n)$, the projected absolute error for Year 1 is still *sae(n)* but for Year 2 it is now just $|D|$ since, on the average, *sae(n)* vanishes. Under Model 3A, where the process change is assumed to be normally distributed, the Year 2 projected absolute error is just the sum of $0.8\,|D|$ and the sampling absolute error from Year 1 *sae(n)*. Under Model 4M the Year 2 projected absolute error is the root mean square quantity $[(0.8\,D)^2 + sae(n)^2]^{1/2}$, which is just the square root of the sum of the squares of the corresponding terms for Model 3A.

Projected Absolute Errors for Selected Models—Models 1 and 2A

Year	Model 1	Model 2A [for $D > sae(n)$]
1	$sae(n)$	$sae(n)$
2	$\|D\| + sae(n)$	$\|D\|$
3	$2\|D\| + sae(n)$	$\|D\| + 0.5\,sae(n)$
4	$3\|D\| + sae(n)$	$1.5\|D\|$
5	$4\|D\| + sae(n)$	$1.5\|D\| + 0.375\,sae(n)$
6	$5\|D\| + sae(n)$	$1.875\|D\|$
Avg *p.a.e.*	$\frac{15}{6}\|D\| + sae(n)$	$\frac{5.075}{6}\|D\| + sae(n)$

Projected Absolute Errors for Selected Models—Models 3A and 4M

Year	Model 3A	Model 4M
1	$sae(n)$	$sae(n)$
2	$0.8\lvert D\rvert + sae(n)$	$0.8\sqrt{D^2 + \left[\frac{sae(n)}{0.8}\right]^2}$
3	$0.8\sqrt{2}\lvert D\rvert + sae(n)$	$0.8\sqrt{2D^2 + \left[\frac{sae(n)}{0.8}\right]^2}$
4	$0.8\sqrt{3}\lvert D\rvert + sae(n)$	$0.8\sqrt{3D^2 + \left[\frac{sae(n)}{0.8}\right]^2}$
5	$0.8\sqrt{4}\lvert D\rvert + sae(n)$	$0.8\sqrt{4D^2 + \left[\frac{sae(n)}{0.8}\right]^2}$
6	$0.8\sqrt{5}\lvert D\rvert + sae(n)$	$0.8\sqrt{5D^2 + \left[\frac{sae(n)}{0.8}\right]^2}$
Avg *p.a.e.*	$\frac{0.8}{6}\sum_{i=1}^{6}\sqrt{i-1}\lvert D\rvert + sae(n)$	$\frac{0.8}{6}\sum_{i=1}^{6}\sqrt{(i-1)D^2 + \left[\frac{sae(n)}{0.8}\right]^2}$

2.3 Model Results Based on Three Rounds of SASS Data

In consultation with NCES staff, we had previously identified several variables deemed important to SASS data users. We then applied the models developed above using three rounds of SASS data at the national level (U.S.) for public and private schools and at the State level for public schools in three selected States (California, Iowa, and New York). The following twelve variables were selected from the School, Administrator, and Teacher questionnaires:

Item 1. Number of students served by chapter 1 services (Schools—public).

Item 4. Number of K-12 teachers that are new to the school this year (Schools—public).

Item 6. Proportion (%) of all schools with minority principals (Adminr—public & private).

Item 7A. Number of students per FTE teacher (Schools—public).

Item 7B. Number of students per FTE teacher (Schools—private).

Item 8A. Proportion (%) of schools in which various programs and services were available to students (Schools—public).

Item 8B. Proportion (%) of schools in which various programs and services were available to students (Schools—private).

Item 9. Proportion (%) of principals having master's degree (Administrator—public).

Item 10A. Proportion (%) of full time teachers who received various types of compensation, by sector (Teacher—public).

Item 10B. Proportion (%) of full time teachers who received various types of compensation, by sector (Teacher—private).

Item 11A. Proportion (%) of full time teachers who were newly hired and who were first time teachers (Teacher—public).

Item 11B. Proportion (%) of full time teachers who were newly hired and who were first time teachers (Teacher—private).

Private school items 7B, 8B, 10B, and 11B were omitted from the State-level computer runs since State-level estimates are not published by NCES for private schools. Item 6, which is based on pooled data for public and private schools combined, was retained in all runs.

We obtained approximate estimates for the fixed cost and the variable cost elements of SASS. We applied the four models for each variable listed above, and computed the projected absolute errors for large-sample scenarios with periodicities of four, five, and six years and a range of variable-tofixed cost ratios. An alternating large-and-small-sample design was also calculated and analyzed. For selected models, the detailed results, estimates, and projected absolute errors are presented for public schools and private schools in the appendix tables of Part II of this report. The detailed results include large-sample scenarios with periodicities of four, five, or six years and

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variable-to-fixed cost ratios of 30:70, 40:60, 50:50, 60:40, and 70:30 and an alternating large-and-small-sample design with a large-sample data collection every six years and a small-sample data collection three years after each large-sample data collection. Numerical results for public schools are presented for national (U.S.) data and for the States of California, Iowa, and New York. Results for private schools are presented at the national level.

2.4 Comments on Results for Large-Sample Scenarios (Models 3A and 4M)

In the course of our theoretical and empirical analyses of the family of probable-error models, we found that the "discriminatory power" of the probable-error models to reveal meaningful differences between neighboring choices of periodicity was greatest for the combination of large sample size, which entails small $sae(n)$, together with relatively large year-to-year process change D. Very large sample sizes are found only in the SASS public-school datasets for the U.S. as a whole. In this report, unless otherwise noted, sample size denotes the size of the actual obtained sample (net of nonresponding units). At the State level, public school sample sizes are in the low hundreds. The following tables and charts provide a consolidated summary of model results for Models 3A and 4M for the U.S. and for the States of California, Iowa, and New York. In these tables and charts the range of periodicities has been extended for expository purposes to a range of 2 to 6 years, while the appendix tables are restricted to a range from 4 to 6 years, which is the range of practical operational interest to NCES under current budgetary restrictions.

For the U.S. as a whole, the projected base case (5-year periodicity and variable-to-fixed cost ratio of 0.5) sample sizes are 9,000 public schools and 48,000 public-school teachers. With these large sample sizes, the averages of the relative projected absolute errors (where the *p.a.e.* divided by the estimate of its variable is the *rel p.a.e.*) for the eight public-school variables under both Model 3A and Model 4M are smallest for short periodicities and largest for longer periodicities even though sample sizes are markedly smaller for the shorter periodicities. The effect of different cost ratio assumptions on the *rel p.a.e.* was not large. For large-sample scenarios the average *rel p.a.e.* is 10 to 20 per cent better for a cost ratio of 70:30 than for 30:70.

For California the base case sample sizes are 350 public schools and 2,100 public-school teachers. For New York the corresponding sample sizes are 270 schools and 1,460 teachers. For Iowa the sample sizes are 160 public schools and 900 teachers. For both California and Iowa, under both Model 3A and Model 4M, the averages of the relative projected absolute errors are larger for short periodicities and smaller for longer periodicities. For New York, the mean values of the *rel p.a.e.* are essentially flat under Model 3A over the periodicity range from 2 to 6 years but under Model 4M the values decline initially, with a minimum at a periodicity of 4 years, and then rise slightly.

Under the probable-error models the data users who are primarily interested in carrying out analyses for individual States will generally incur smaller errors if they are provided with datasets from longer periodicities and hence larger sample sizes. Data users who are primarily interested in carrying out analyses for the U.S. as a whole will incur smaller errors if they are provided with datasets from shorter periodicities and correspondingly smaller sample sizes. Again, it is important to note that the mean *rel p.a.e.* values do not exhibit large differences over the range of periodicities. Nonetheless, State-level analyses are generally favored by longer periodicities and their correspondingly larger sample sizes.

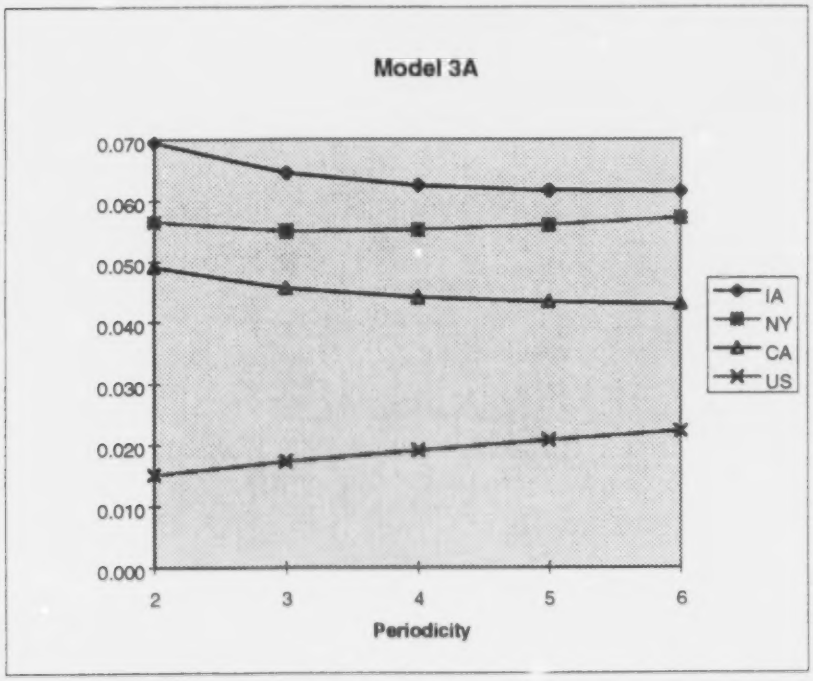
SASS Data and *rel p.a.e.* for Selected Policy Variables
under a Fixed Total Cost and Cost Ratio p=0.5
U.S. – Public Schools

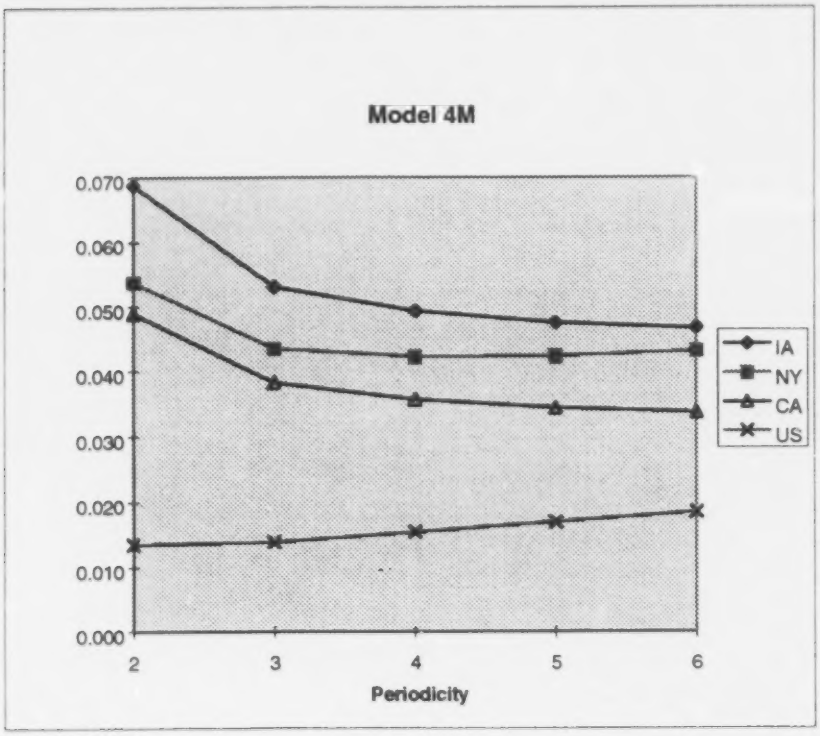
Item	SASS estimates Source	Pooled Mean	Estim Std Dev	Avg D	Avg D%	Ref N
#1	School (Pub)	104.591	150.153	3.855	3.7%	9,000
#4	School (Pub)	3.214	4.000	0.175	5.4%	9,000
#6	Administrator (Pub & Pri)	0.095	0.292	0.003	2.9%	11,500
#7A	School (Pub)	16.979	5.280	0.234	1.4%	9,000
#8A	School (Pub)	0.993	0.084	0.001	0.1%	9,000
#9	Administrator (Pub)	0.972	0.166	0.004	0.4%	9,000
#10A	Teacher (Pub)	0.386	0.486	0.010	2.5%	48,000
#11A	Teacher (Pub)	0.034	0.181	0.001	3.5%	48,000

Item	Model 3A Source	Rel p.a.e. Mod 3A p=0.5 -- Periodicity -- 2 yrs	3 yrs	4 yrs	5 yrs	6 yrs
		2	3	4	5	6
#1	School (Pub)	0.0339	0.0394	0.0441	0.0484	0.0523
#4	School (Pub)	0.0384	0.0486	0.0569	0.0640	0.0704
#6	Administrator (Pub & Pri)	0.0481	0.0484	0.0498	0.0516	0.0534
#7A	School (Pub)	0.0096	0.0122	0.0143	0.0161	0.0178
#8A	School (Pub)	0.0014	0.0014	0.0014	0.0014	0.0014
#9	Administrator (Pub)	0.0041	0.0047	0.0053	0.0058	0.0063
#10A	Teacher (Pub)	0.0173	0.0221	0.0260	0.0293	0.0323
#11A	Teacher (Pub)	0.0448	0.0476	0.0508	0.0538	0.0568
Avg		0.015	0.017	0.019	0.021	0.022

Item	Model 4M Source	Rel p.a.e. Mod 4M p=0.5 -- Periodicity -- 2 yrs	3 yrs	4 yrs	5 yrs	6 yrs
		2	3	4	5	6
#1	School (Pub)	0.0295	0.0312	0.0357	0.0400	0.0441
#4	School (Pub)	0.0337	0.0407	0.0489	0.0563	0.0630
#6	Administrator (Pub & Pri)	0.0444	0.0373	0.0375	0.0388	0.0406
#7A	School (Pub)	0.0085	0.0103	0.0124	0.0142	0.0159
#8A	School (Pub)	0.0013	0.0011	0.0010	0.0010	0.0011
#9	Administrator (Pub)	0.0035	0.0038	0.0043	0.0048	0.0053
#10A	Teacher (Pub)	0.0152	0.0186	0.0225	0.0259	0.0290
#11A	Teacher (Pub)	0.0400	0.0365	0.0389	0.0418	0.0449
Avg		0.013	0.014	0.015	0.017	0.018

Average *rel p.a.e.* for Selected Policy Variables, Fixed Total Cost and p=0.5





2.5 Comments on Results for An Alternating Large-and-Small-Sample Design (Models 3A and 4M)

The previous section has discussed the modeling results for large-sample scenarios with various intersurvey intervals. Detailed results for scenarios under Models 1, 2A, 3A, and 4M are set forth in Appendix A and Appendix C for public schools and private schools respectively. Detailed analysis of those results has led in turn to the formulation of an alternating large-and-small-sample design. The results for a specific hypothetical implementation of this design approach are set forth in Appendix B and Appendix D for public schools and private schools respectively.

A specific "Interleaved 3-6-9 Design" was formulated as follows: First , assume the same fixed annualized resource budget that would otherwise support the large-sample scenarios with a periodicity of five years over a range of cost ratios (30:70, 40:60, 50:50, 60:40, 70:30). Then the assumed obtained sample sizes for the U.S. at the mid-point 50:50 cost ratio were 9,000 public schools and 48,000 teachers. These sizes were proportionally smaller or larger for smaller or larger cost ratios. Next, assign these sample sizes to a periodicity of six years instead of to a periodicity of five years. This results in a "cost dividend" of 20 per cent which is then invested in a one-fifth U.S. sample of 1,800 public schools and 9,600 teachers for a data collection which can be conducted at the halfway point between two full-sample data collections; namely, three years after the previous large data collection. Assume that there is no processing delay. For simplicity, also assume that the schools in the one-fifth sample are nonoverlapping with the schools in the full sample. Further assume that for the U.S. as whole only direct estimates will be of interest and, hence, the two independent samples (the full sample and the one-fifth sample) will be treated as independent cross-section surveys three years apart.

Now consider the projected absolute errors that will be incurred by a data user over a six-year period. During the first, second, and third years after a full-sample data collection a data user who is interested in national data will continue to use that sample. Under either Model 3A or Model 4M the projected absolute errors will increase each year. In the fourth year after the large sample data collection a new dataset from the one-fifth size national sample will become available. The data user then disregards the data in the old large sample and begins to use the data from the new one-fifth sample and continues to use it until data from the next full sample becomes available in the seventh year. For the U.S., the sample sizes in the one-fifth national sample are large enough that quite good estimates may be made. That is the user is not heavily penalized in shifting every three years between the full national sample and the one-fifth national sample. For the cost ratio p=0.5 an inspection of the tables in Appendix B for each of the eight policy variables, and of the average *rel p.a.e.* values over six years for each of these variables as displayed in the U.S. summary sheet, reveals in a comparison with the corresponding Appendix A tables that the average *rel p.a.e.* values for the interleaved "3-6-9" design with large sample periodicity of six years are less than or equal to the average *rel p.a.e.* values for the single large-sample scenario with periodicity of five years. Furthermore, the user of U.S.-level data will be receiving the benefits associated with the receipt of fresh data every three years.

Referring now to the tables in Appendix B, we see that some of the sample sizes for public schools in the State portion of the one-fifth national sample ("3-6-9" Design) have shrunk to rather small sizes, ranging (for p=0.5) from 32 schools in Iowa to 70 schools in California. The teacher sample sizes have also shrunk, now ranging (for p=0.5) from 180 teachers in Iowa to 420 teachers in California. Although the user of State-level data might choose to ignore the State portion of the National sample, we have assumed for the purposes of the Appendix B tables that the user would

opt to make use of an appropriate composite estimator based on the joint use of the two independent datasets from the State portion of the full sample and from the State portion of the one-fifth sample. Accordingly, the tables for each policy variable contain, for Model 3A and Model 4M, a State composite subtable of *p.a.e.* values in which the values for the fourth, fifth, and sixth years are root mean square composites of the *p.a.e.* values from the full sample and the one-fifth sample.

For public school variables in Iowa, for example, the "3-6-9" composite average *rel p.a.e.* values are slightly higher than the corresponding Appendix A values for a full sample with periodicity of five years. For teacher policy variables the composite average *rel p.a.e.* values are about equal to the Appendix A values for a full sample with periodicity of five years.

The user of the State-level datasets from the full sample and the one-fifth size small sample might alternatively opt for the explicit use of one of the time series modeling techniques described in section 3 below to construct minimum mean squared error estimates. Further analysis of such procedures is beyond the scope of the present report.

The following table provides a national-level, Public Schools example of the modeling results (for Model 3A) under an alternating large-and-small sample design (the Interleaved 3-6-9 Design) with selected cost ratios of 30:70, 50:50, and 70:30. Further results and underlying detail may be found in Appendix B.

Relative Projected Absolute Errors under Model 3A
National (Public Schools) Interleaved 3-6-9 Design

						Rel p.a.e. Mod 3A		
		Pooled	Estim				Cost Ratio	
Item	Source	Mean	Std Dev	Avg D	Ref N	0.3	0.5	0.7
#1	School (Pub)	104.591	150.153	3.855	9,000	0.044	0.038	0.034
#4	School (Pub)	3.214	4.000	0.175	9,000	0.048	0.042	0.039
#6	Admnr (Pub & Pri)	0.095	0.292	0.003	11,500	0.062	0.052	0.046
#7A	School (Pub)	16.979	5.280	0.234	9,000	0.012	0.011	0.010
#7B	School (Pri)							
#8A	School (Pub)	0.993	0.084	0.001	9,000	0.002	0.001	0.001
#8B	School (Pri)							
#9	Admnr (Pub)	0.972	0.166	0.004	9,000	0.005	0.005	0.004
#10A	Teacher (Pub)	0.386	0.486	0.010	48,000	0.021	0.019	0.017
#10B	Teacher (Pri)							
#11A	Teacher (Pub)	0.034	0.181	0.001	48,000	0.058	0.049	0.044
#11B	Teacher (Pri)							
Avg						0.019	0.016	0.015

The following table provides a national-level, Private Schools example of the modeling results (for Model 3A) under an alternating large-and-small sample design (the Interleaved 3-6-9 Design) with

selected cost ratios of 30:70, 50:50, and 70:30. A comparison with the summary table in Appendix C for a private school scenario with a periodicity of 5 years and a 50:50 cost ratio shows an average *rel p.a.e.* of 0.040 versus 0.039 in the table below; that is, they have essentially identical average *rel p.a.e.* values. Thus there is no penalty in terms of the average *rel p.a.e.* values as a result of using the alternating design versus the conventional periodic design and there is added value in that fresh data are available every three years. Further results and underlying detail may be found in Appendix D.

Relative Projected Absolute Errors under Model 3A
National (Private Schools) Interleaved 3-6-9 Design

Item	Source	Pooled Mean	Estim Std Dev	Avg D	Ref N	Rel p.a.e. Mod 3A Cost Ratio 0.3	0.5	0.7
#1	School (Pub)							
#4	School (Pub)							
#6	Adminr (Pub & Pri)							
#7A	School (Pub)							
#7B	School (Pri)	15.674	18.494	0.463	2.500	0.054	0.045	0.041
#8A	School (Pub)							
#8B	School (Pri)	0.841	0.366	0.001	2.500	0.015	0.011	0.010
#9	Adminr (Pub)							
#10A	Teacher (Pub)							
#10B	Teacher (Pri)	0.269	0.442	0.016	8.000	0.059	0.052	0.047
#11A	Teacher (Pub)							
#11B	Teacher (Pri)	0.065	0.246	0.004	8.000	0.100	0.084	0.075
Avg						0.046	0.039	0.035

2.6 Uses and Limitations of Existing Probable-Error Modeling Methods

We have noted above many of the simplifying assumptions made in the construction and use of the family of probable-error models. In the first three rounds of SASS, conducted at three-year intervals, approximately 30 percent of the schools were in successive rounds. This partial overlap was an explicit part of the SASS design. It does, however, induce a round-to-round correlation between successive observations on the overlap schools. Any effects of such correlations have not been dealt with in our existing probable-error models. In the case of the time series modeling approaches discussed in section 3 below, there are available techniques for dealing explicitly with correlated errors and other effects of overlap.

In general, Model 3A and Model 4M have given generally consistent results in profiling the approximate magnitude and direction (increasing or decreasing with periodicity choices) of the projected absolute errors for selected policy variables and combinations thereof.

3. Time Series Methods in Relation to the Periodicity Problem

3.1 Background on Time Series Methods for Repeated Surveys

Since the early papers of Scott and Smith (1974) and Scott, Smith, and Jones (1977), there has been a renewed and growing interest in the application of time series methods to survey data. An excellent review article, Binder and Hidiroglou (1988), may be found in volume 6 of the *Handbook of Statistics*. This review and the papers by Bell (1984), Bell and Hillmer (1990), and Tam (1987) provide a balanced account of time series approaches, including state-space modeling and Kalman filter techniques, for use with data from repeated surveys. Although most statisticians are now aware of the time series methods of Box and Jenkins (1970), who provided an understandable, systematized approach to model identification, estimation, and forecasting, many survey statisticians are still unaware of the potential of the time series methods for improving estimation with survey data in the sense of minimizing mean squared error. The key principle in the time series approach is that there is information in the time series structure of an observed process which may be used to make better estimates by combining information from past data collections with the new information from a current data collection than would be made if the current data were to be used alone.

Classical survey estimates are made under assumptions that the observed variables, whether of labor force, or school enrollment, or other socioeconomic phenomena, have values that are fixed but are observed with sampling error (and possibly nonsampling error). The time series approach regards the process variables as stochastically varying over time and the identification problem is to find a parsimonious time series model evolving in discrete time such as one-year intervals, that will capture the main features of the underlying process sufficiently well. For univariate processes it has often been found to be quite satisfactory to fit a model with a very simple structure, such as an autoregressive model of order 1 or 2.

In the case of surveys of schools and similar institutions, the natural accounting period is the school year. Within-year changes are of secondary interest and seasonal effects do not arise. Linear trends are easily incorporated in Box-Jenkins type models and can be factored out by taking first differences of successive observations. Thus the trend component may be accounted for separately. One useful model that is related to classical exponential smoothing is the Box-Jenkins ARIMA(0,1,1). It is mildly nonstationary and can "wander" up and down; in one sense the current process value serves as a "local mean" for the process as time moves ahead one step and the process noise term kicks the process up or down a bit. In classical Box-Jenkins modeling it is assumed that the process is observed without observation error.

Borrowing from the contributions of R. Kalman in the control engineering literature in the 1960s, the Scott-Smith time series approach utilizes a two-equation setup in which there is a process equation which represents the evolution of the underlying (unobserved) process through time. The second equation, the observation equation, consists of the sum of the underlying process variable and an observation noise term. The noise term in some simple models may just represent the sampling error. In other cases it may have a structure of its own. The state of the process may be represented by a vector with two or more components, representing, for example, the levels of two or more process variables such as number of teachers and number of students at a school, or in an aggregate of schools within a State or other subnational grouping.

For example, if we assume that an m-component state vector $\mathbf{x}(t)$ evolves according to a vector random walk, we may write for the process equation

$$\mathbf{x}(t+1) = \mathbf{x}(t) + \mathbf{w}(t) ,$$

where $\mathbf{w}(t)$ is the process noise and is distributed as a multivariate normal, $N(\mathbf{0}, \mathbf{Q})$, with a zero mean vector and known process disturbance covariance matrix $\mathbf{Q}$, where $\mathbf{Q} = E[\, \mathbf{w}(t)\, \mathbf{w}'(t)\,]$, $t = 0,1,2,\ldots$. The classical Kalman approach is to assume that $\mathbf{Q}$ is known and is time invariant.

The process variable $\mathbf{x}(t)$ is sometimes referred to as a "signal" which can only be observed in the presence of observation noise. The task is then to "extract" the signal from the surrounding noise. We then write an observation equation

$$\mathbf{y}(t) = \mathbf{x}(t) + \mathbf{u}(t) ,$$

where $\mathbf{u}(t)$ is the observation noise and may simply represent sampling error or might represent a more complicated form of measurement error. We may postulate a unit noise covariance matrix $\mathbf{R}$ for an observation on a sample of size one and a sample noise covariance matrix $\mathbf{B}(t)$ obtained by dividing the elements of $\mathbf{R}$ by a sample size $N(t)$. For the simple random walk model, the optimal estimate between surveys is just the last previous estimate, say $\mathbf{x}\hat{}(t \mid t)$, given all information up through time t. That is,

$$\mathbf{x}\hat{}(t + j \mid t) = \mathbf{x}\hat{}(t \mid t) .$$

When a new survey is taken (an observation is made), with an intersurvey interval of T years, the optimal estimate at that instant will be

$$\mathbf{x}\hat{}(t \mid t) = \mathbf{x}\hat{}(t \mid t - T) + K(t) [\, \mathbf{y}(t) - \mathbf{x}\hat{}(t \mid t - T)\,] ,$$

where $K(t)$ is known as the Kalman gain and is obtained from operations on the variance-covariance matrices for the process noise and the observation noise.

Thus it may be seen the new estimate is a weighted combination of the new observation and the optimal estimate from the most recent previous survey cycle. There are certain details, such as the need to initialize the process state at time zero, but this simple example shows the essence of the signal extraction approach via the Kalman filter.

The classical Kalman approach assumes that the variance-covariance matrices associated with the process equation and the observation equation are known and time invariant. In real world settings, these matrices will not be known and will have to be estimated from the data. Furthermore, they will not necessarily be time invariant. These complications have led to the formulation of extended Kalman filters. The extended filters place an estimation burden on the available data and may lead to inconclusive results. Also, it is somewhat awkward to try to accommodate nonlinear features such as the presence of level-dependent variances. For example in a set of elementary schools arranged by size within one State, the variance in enrollment or in number of teachers will typically depend on the size of the school and hence the number of

teachers. This is easier to capture using one of the model types known as state-dependent models and in particular with a class of models known as bilinear models (see Smith, 1994).

3.2 Concept of Equivalent Sample Size in Kalman Filtering for Repeated Surveys

In Chapter II of Smith (1980) the concept of *equivalent sample size* was introduced in the context of Kalman filtering for repeated surveys and adapted to a reformulation of the optimal filter theorem for a scalar (single-variable) model (which was designated as "Scalar Model 1") of an evolving process observed at discrete points in time. A similar description of that development also appears in Smith, Ghosh, and Chang (1995).

See section 5.1 below for a technical account of the development of an equivalent-sample size form of the Kalman filter and its application to random walk models of repeated surveys. In connection with that development, Smith and Barzily (1982) noted that "a survey administrator who was concerned that the underlying process parameters may take unexpected jumps or exhibit turning points, which are not modeled by the simple time-invariant random walk models, would presumably opt for sampling more frequently than the optimal interval found by this method."

3.3 An Exploration of Modeling with Joint Use of CCD and SASS Data

One of the consequences of the popularization of the Box-Jenkins methods is that many statistical practitioners may assume that one cannot use time series methods unless one has a long time series of 40 to 60 observations. T.W. Anderson (see Anderson, 1978) showed that replicated cross-sectional observations with a sizable number of repeated measures at a few points in time can substitute quite well for single observations stretched out over time. While there are limitations to this approach, Azzalini (1981) and others have recognized the value in this approach. In some cases it may be implemented rather simply with standard statistical software.

Shumway (1988) applied the replicated autoregressive model of Anderson (1978) to a problem of forecasting grade-by-grade enrollments for a group of public elementary schools. He used four years of kindergarten-through-grade 6 data for a set of 12 schools and modeled the school enrollments as a vector autoregressive process of order 1. We provisionally adopted Shumway's general approach and investigated whether or not it could be extended to assess the possible dependence of components observed in the SASS periodic series, but unobserved in the Common Core of Data (CCD) series, on the observed components in the annual CCD series. Thus some variables were only present in the SASS series and were only observed every three years and some variables, such as grade-by-grade enrollment and teacher counts, were present in both series and moreover were observed every year in the CCD series. Shumway and Stoffer (1982) included some techniques for using the EM algorithm for estimation in both the complete-data case and in the case of irregularly observed data.

For a test data set of eight California public elementary schools we constructed year-by-year process and observation state vectors with 16 components. These components included enrollments for kindergarten through grade 8, enrollment counts for ungraded students, full-time equivalent teacher counts, per cent minority enrollment, number of school lunch eligibles, number of school lunches served, chapter 1 services provided, and a component to be assigned. The first 12 components were observed in the annual CCD series, the 13th component (school lunch

eligibles) was observed in both CCD and SASS, and the last three components were observed, if at all, only in SASS and only at three year intervals.

The theoretical formulation of a Markovian state-space model is described in section 5.2 of the Technical Supplement. In principle, the state-space approach carried over smoothly from the case of regularly (uniformly) spaced observations to the case of irregularly observed processes. Suitable recursive computational methods were available from the results in Shumway and Stoffer (1982). These included the steps needed for maximum likelihood estimation using the EM algorithm for the complete-data case as well as the extensions for the irregularly observed data problem.

In practice, the available test data sets were not adequate for the planned analyses. In particular, for variables other than enrollment, it was found that variables, such as school lunch variables, that should have been observed every year in CCD were not in fact present in the database for every year and variables such as chapter 1 services were not uniformly reported in SASS. Where the analyses could be performed, for a small subset of schools, it was found that the dependencies of SASS variables on CCD variables, as shown by correlation matrices, were neither strong nor stable. No further work was pursued on these methods beyond these initial investigations.

3.4 Uses and Limitations of Time Series Modeling Approaches

In the proceedings paper (Ghosh *et al.*, 1994) and technical report (Ghosh *et al.*, 1995) covering our previous study one of the present authors (D. Ghosh) set forth some new alternative models in the form of "probable-error" models which appeared to provide decision support for optimal choice of sample sizes and intersurvey interval, using data for a subset of variables at the geographic level of interest, without detailed model fitting of the underlying observed processes. Our current work with this family of models has been reviewed in section 2.

Consideration of indirect (time series) estimation methods as an alternative to this direct approach was summarized Smith, Ghosh, and Chang (1995). That discussion also led to the investigation described described in section 3.3 concerning the possible application of Shumway's Markovian grade-by-grade analysis to joint estimation procedures utilizing CCD and SASS data together. As stated there, the results of that investigation were inconclusive. Furthermore, there is no current operational requirement by NCES for the development of indirect estimation methods. It is our understanding that NCES will continue to adhere to its current practice of using only direct estimates from survey data for production and publication of national and State-level results from SASS.

As noted in section 2, the user of State-level SASS datasets, especially under the "3-6-9" interleaved design for alternating large-and-small samples, might wish to explore the feasibility of applying one or more of the time series modeling techniques described above in order to obtain minimum mean squared error estimates for selected policy variables.

4. Conclusions and Recommendations

4.1 Lessons from Probable Error Modeling and Time Series Approaches

The probable-error models described in section 2 of this report are based on a number of simplifying assumptions. Section 3 of the present report summarizes other available methods for modeling and analysis of repeated surveys, particularly time series methods stemming from the early work of Blight and Scott (1973) and Scott and Smith (1974) as well as the more recent "signal processing" approach of Bell (1984), Bell and Hillmer (1990), and others. Section 3 also reviewed the uses and limitations of one implementation of the Scott-Smith-Jones time series approach, namely the Smith-Zalkind-Barzily optimization tools first set forth in detail in Smith (1980). The results on optimal choice of periodicities for the Schools and Staffing Survey provided in the present report were obtained by applying Models 1, 2A, 3A, and 4M to 1987-88, 1990-91, and 1993-94 SASS data.

Some users of national-level data would be better off with more frequent data availability even if the estimates were based on reduced sample sizes. One difficulty is that "publishable estimates" and "usable microdata" depend on which survey variables or construct variables are of interest to a particular data user. Furthermore, once the SASS databases provided to users are constructed from a "smaller but more frequent" SASS design, some State-level analyses could no longer be conducted using simple cross-sectional weights, but would have to take into account the more complex design elements.

The main research effort carried out in the present study has been directed at refining and extending the probable-error models developed under the previous study and applying these models to data from three rounds of SASS (i.e., for school years 1987-88, 1990-91, and 1993-94). In the previous study, national data from two rounds of SASS were analyzed using four different probable-error models with alternative intersurvey intervals (i.e., periodicities) of 2, 3, or 4 years. In the current study, national and selected State-level data from three rounds of SASS have been analyzed (for the U.S. and for California, Iowa, and New York) using four different probable-error models with alternative intersurvey intervals of 4, 5, or 6 years and five specific scenarios for ratios of variable-to-fixed costs within an assumed budget constraint.

Each analysis was replicated over data for 12 different policy variables that had been specified by NCES for use in the previous study and in the current study. There were four variables from the SASS public school questionnaire (Items 1, 4, 7A, and 8A), two variables from the private school questionnaire (Items 7B and 8B), two items each from the public (Items 10A and 11A) and private (Items 10B and 11B) teacher questionnaires, respectively, one item from the public administrator questionnaire (Item 9), and one item analyzed on a combined basis for public and private administrators (Item 6).

The base case was assumed to be an intersurvey interval of 5 years at a 50:50 ratio of variable-to-fixed cost. The dollar amount was assumed to be a five-year budget equal to the average of the previous two three-year budgets that were available when the intersurvey interval was 3 years. This has provided a base case sample size of approximately 9,000 public schools and 2,500 private schools for the school data collections at the assumed 5-year intervals and 50:50 cost ratio. For the associated teacher data collections the base case sample sizes are 48,000 public school teachers and 8,000 private school teachers. The base case sample size for principals/headmasters is then

11,500 for public and private schools combined. The sample sizes are perturbed in a linear fashion for 5-year interval cases over the variable-to-fixed cost ratios of 30:70, 40:80, 50:50, 60:40, and 30:70. That is, at 30:70 the base case public school sample size becomes 5,400 and at 70:30 the public school sample size becomes 12,600. When the intersurvey interval is reduced from 5 to 4 years, the public school sample sizes are reduced to 4,320 at 30:70, 7,200 at 50:50, and 10,080 at 70:30. Similarly, when the intersurvey interval is increased from 5 to 6 years, the public school sample sizes are increased to 6,480 at 30:70, 10,800 at 50:50, and 15,120 at 70:30.

The three rounds of SASS data collection provided estimates, at national and State level, of the average change in each policy variable over the two past three-year intervals. Pooled means and estimated population standard deviations were also constructed for each policy variable. Projected absolute errors and relative projected absolute errors (or *rel p.a.e.*) were then computed, at the national level (U.S.) year by year, for the selected probable-error models (Models 3A and 4M), for each of 12 policy variables, for each of 3 periodicities, and for each of 5 cost-ratio scenarios. For three selected States (CA, IA, and NY), the same runs were made with the exception that the private-school variables (Items 7B, 8B, 10B, and 11B) were excluded since NCES does not publish State-level estimates for private school variables. As noted in section 2, the effect of different cost ratio assumptions on the projected absolute errors was not large.

Referring to the Appendix A summary sheet table entries for projected absolute errors under each of the Models 1, 2A, 3A, and 4M and a 50:50 cost ratio for Public Schools data collections at the national level (U.S.) we see that the choice of a 4-year periodicity typically results in lower average projected absolute errors (and *rel p.a.e.*) than does a 5-year periodicity, and that a 5-year periodicity yields lower errors than does a 6-year periodicity. State-level projected absolute errors were essentially flat over the periodicity choices of 4, 5, or 6 years although in some cases the longer periodicities resulted in slightly lower *rel p.a.e.* values.

Similarly, from Appendix C for Private Schools (U.S. national level), using the same four models, we see that the choice of a 4-year periodicity results in lower average projected absolute errors than does the choice of longer periodicities.

For most sample sizes and most of the tested policy variables, the probable-error models do not sharply discriminate between adjacent choices of periodicity. This outcome parallels some results in Smith (1980) where it was noted that the minima for the imputed cost models used in that work were not sharply different for neighboring choices of periodicity.

Again, it should be noted that Model 3A does involve an assumption of normality for the process disturbance. For some variables of interest this assumption may appear to hold, at least approximately, while for others it may not. Model 4M has a number of attractive properties and is a truly stochastic model. The assumption of a Random Walk process for a discrete time series estimated from a sequence of repeated cross-section surveys has often proven useful.

In general, State-level analyses are best supported by longer periodicities, while U.S.-level analyses are best supported by shorter periodicities. In summary, the probable-error models have provided a direct, approximate method for characterizing the problem of making a joint choice of intersurvey interval and sample size under a fixed annual cost constraint.

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4.2 A Recommended Structure for Future SASS Data Collections

The main recommendation from the present study is that the National Center for Education Statistics should consider adopting an Alternating Large-and-Small-Sample Design for SASS with an appropriate full-sample periodicity (such as six years) together with a mid-period fractional-sample data collection to be conducted half way between the full-sample data collections. The mid-period data collection would provide a periodic update at the national level and for the larger States.

For Public Schools (national level), with an assumed 50:50 cost ratio under both Models 3A and 4M, the Alternating Design with a full-sample periodicity of six years and fractional-sample data collections three years after each full-sample data collection ("3-6-9" pattern), leads to slightly smaller average relative projected absolute errors under the same modeling assumptions than would a fixed full-sample periodicity of five years and no fractional-sample data collection at mid-period (the "Fixed Design"). Specifically, we have obtained average *rel p.a.e.* values of 0.016 and 0.014 for the Alternating Design versus 0.021 and 0.017 for the five-year Fixed Design under Models 3A and 4M respectively.

The following results were extracted from the summary sheets for Public Schools in Appendix A and Appendix B and for Private Schools in Appendix C and Appendix D.

SASS Schools	Rel p.a.e. for 50:50 cost ratio			
	Fixed Design		**Alternating Design**	
	Model 3A	Model 4M	Model 3A	Model 4M
Public				
Iowa	0.062	0.047	0.065	0.052
New York	0.056	0.042	0.058	0.045
California	0.043	0.034	0.046	0.037
National (U.S.)	0.021	0.017	0.016	0.014
Private				
National (U.S.)	0.040	0.033	0.039	0.033

For Private Schools (national level only), with the same 50:50 cost ratio and use of Models 3A and 4M, the Alternating Design for a "3-6-9" pattern leads to average *rel p.a.e.* values of 0.039 and 0.033 versus 0.040 and 0.033 for the five-year Fixed Design under Modesl 3A and 4M; that is, the Alternating Design yields *rel p.a.e.* values that are either the same or lower than the values for the Fixed Design for national level Private School estimates.

Thus, for both Public Schools and Private Schools at the national level, the approximate annualized multi-year costs for the Alternating Design and the Fixed Design are equal, but the Alternating Design has the advantage of equal or lower average relative projected absolute errors and produces updated national estimates every three years instead of every five years. Furthermore, the State level estimates for Public Schools are not appreciably higher under the Alternating Design (full sample every six years) than under the Fixed Design (full sample every five years).

5. Technical Supplement

This Technical Supplement provides supplementary information which further describes the theoretical and empirical basis for some of the topics and analyses presented in previous sections of this report.

5.1 Equivalent Sample Size Form of the Kalman Filter and Its Application to Random Walk Models of Repeated Surveys [cross-reference Sec. 3.2]

Consider a repeated survey system in which the process state is represented by the scalar state variable $x(j)$ evolving as a scalar random walk in discrete time, $x(j) = x(j-1) + w(j)$, where $w(j)$ is the process noise term, with scalar survey measurements $y(k)$ given by $y(k) = x(k) + b(k)$, where $b(k)$ is the measurement noise term and the sample size at each survey time k is the scalar quantity $n(k)$ and the sample noise variance $B(k)$ is given by $B(k) = R / n(k)$, where R is the (constant) unit measurement noise variance. The Kalman gain in the optimal filter theorem then becomes

$$K(k) = C(k|k-T)\,[\,C(k|k-T) + B(k)\,]^{-1}$$

$$= [C(k-T|k-T) + TQ] / [C(k-T|k-T) + TQ + R/n(k)],$$

which is of the same form as the exponential smoothing parameter in a development due to Harrison; see Harrison and Stevens (1976). The error variance equations in the optimal filter theorem are now of the form

Between surveys

$$C(k+j \mid k) = C(k \mid k) + j\,Q,$$

At surveys

$$C(k \mid k) = [1 - K(k)\,]\,C(k \mid k-T),$$

where $C(0 \mid 0)$, Q, and R are positive scalars and so are $K(k)$, $C(k \mid k)$, and $C(k+j \mid k)$. In this development the scalar quantity $n^{\circ}(k \mid k)$ was then defined by $n^{\circ}(k \mid k) = RC^{-1}(k \mid k)$ and referred to as the "updated equivalent sample size after surveying at survey time k with no processing delay." It was further interpreted in inventory terms as the level of a *stock of information* on hand immediately after ordering $n(k)$ additional units (with no leadtime); that is, as an inventory *order level*. The scalar quantity $n_r(k+j \mid k)$ was defined by $n_r(k+j \mid k) = RC^{-1}(k+j|k)$ and referred to as the "equivalent sample size remaining at time $k+j$, j time units after the survey time k." It was interpreted in inventory terms as the *stock on hand* j time units after ordering and receiving new stock. For a fixed interval T between surveys, assuming the system was in steady state, $n_r(k \mid k-T)$ was interpreted in inventory terms as the *reorder point* and T as the *scheduling period*.
The Kalman gain is then

$$K(k) = n(k) / [n_r(k|k-T) + n(k)]$$

and the updated equivalent sample size is then

$$n^{\circ}(k|k) = n_{\circ}(k|k-T) + n(k) .$$

A further interpretation of $n^{\circ}(k|k)$ was that it is the size of a survey that would be required to have the same degree of precision as that provided by the combined amount $n_{\circ}(k|k-T) + n(k)$. This development led to an *equivalent sample size* form of the error variance equations in the optimal filter theorem for Scalar Model 1:

Between surveys

$$n_{\circ}(k+j \mid k) = n^{\circ}(k|k) \, [\, 1 + jQR^{-1} \, n^{\circ}(k|k) \,]^{-1} ,$$

At surveys

$$n^{\circ}(k \mid k) = n(k) + n^{\circ}(k-T \mid k-T) \, [\, 1 + TQR^{-1} \, n^{\circ}(k-T \mid k-T) \,]^{-1} .$$

Smith and Barzily (1982) gave a numerical example for a two-item process assumed to be a vector random walk with scalar sample size n_d and integer sampling interval T ($T = 1, 2, ..., 10$ years). With assumed cost coefficients for start-up cost and unit costs of interviewing, they demonstrated that the cost function J was convex in (n_d, T) and found a minimum for J by a numerical search.

5.2 Formulation of Grade-by-Grade Markovian State-Space Model [cross-ref: Sec. 3.3]

A model set forth in Shumway (1988) was adapted to support the composite modeling and estimation of policy variables through the joint use of CCD and SASS data. The theoretical formulation as a Markovian state-space model was straightforward. There was a process equation (or system equation):

$$\underset{16x1}{\mathbf{x}(t)} = \underset{16x16}{\mathbf{\Phi}(t)} \; \underset{16x1}{\mathbf{x}(t-1)} + \underset{16x1}{\mathbf{w}(t)}$$

The system state at time zero is $\mathbf{x}(0)$.

There was an observation equation (or measurement equation):

$$\mathbf{y}(t) = \mathbf{M}(t) \, \mathbf{x}(t) + \mathbf{v}(t)$$

The matrix $\mathbf{\Phi}(t)$ was the "transition matrix." The matrix $\mathbf{M}(t)$ was the "design matrix" or "observation matrix." The vector $\mathbf{w}(t)$ was the system noise (or process disturbance) vector; with $E[\mathbf{w}(t)] = \mathbf{0}$. The vector $\mathbf{v}(t)$ was the observation noise (or measurement noise) vector; with $E[\mathbf{v}(t)] = \mathbf{0}$.

The process covariance matrix was $\mathbf{Q}(t) = E[\mathbf{w}(t) \, \mathbf{w}(t)']$.

The observation covariance matrix was $\mathbf{R}(t) = E[\mathbf{v}(t)\, \mathbf{v}(t)']$.

The conditional mean was $\mathbf{x}(t \mid s) = E[\mathbf{x}(t) \mid \mathbf{y}(1), \mathbf{y}(2), \ldots, \mathbf{y}(s)]$.

The mean-squared error covariance matrix $\mathbf{P}(t \mid s)$ of the estimator $\mathbf{x}(t \mid s)$ was $\mathbf{P}(t \mid s) = E[(\mathbf{x}(t) - \mathbf{x}(t \mid s))\, (\mathbf{x}(t) - \mathbf{x}(t \mid s))' \mid \mathbf{y}(1), \mathbf{y}(2), \ldots, \mathbf{y}(s)]$.

The calculation of the *Kalman filter estimators* proceeded by the *forward recursions* [cf. Shumway (1988), p. 177]

$$\mathbf{x}(t \mid t-1) = \mathbf{\Phi}(t)\, \mathbf{x}(t-1 \mid t-1)$$

$$\mathbf{x}(t \mid t) = \mathbf{x}(t \mid t-1) + \mathbf{K}(t)\, [\mathbf{y}(t) - \mathbf{M}(t)\, \mathbf{x}(t \mid t-1)]$$

for $t = 1,\ldots,T$ and $\mathbf{x}(0 \mid 0) = \boldsymbol{\mu}$. The *Kalman gain* matrix $\mathbf{K}(t)$ was defined as

$$\mathbf{K}(t) = \mathbf{\Phi}(t)\, \mathbf{P}(t \mid t-1)\, \mathbf{M}(t)\, [\mathbf{M}(t)'\, \mathbf{P}(t \mid t-1)\, \mathbf{M}(t) + \mathbf{R}(t)]^{-1} .$$

For $\mathbf{M}(t) = \mathbf{I}$, the identity matrix, $\mathbf{\Phi}(t) = \mathbf{\Phi}$, a constant matrix, and $\mathbf{R}(t) = \mathbf{R}$, a constant matrix, then $\mathbf{K}(t)$ reduced to

$$\mathbf{K}(t) = \mathbf{\Phi}\, \mathbf{P}(t \mid t-1)\, [\mathbf{P}(t \mid t-1) + \mathbf{R}]^{-1} .$$

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Part II Error Projections: Selected Models, Policy Variables, Cost Ratios and Periodicities

The following four appendices provide documentation for the Schools and Staffing Survey (SASS) data used in the present study, for estimates of the pooled mean values of the twelve selected policy variables (seven for public schools, four for private schools, and one item applicable to all schools), for their estimated standard deviations, and for an average year-to-year magnitude of change D for each variable. They also provide documentation for the year-to-year evolution of the projected absolute errors (p.a.e.) under the selected models, scenarios, and periodicity patterns. As noted in the labels for specific tabulation, the errors for each policy variable are typically shown as relative projected absolute errors (rel *p.a.e.*) obtained by dividing the *p.a.e.* by the estimated mean value of the variable.

For the United States as a whole and for the States of California, Iowa, and New York, Appendix A presents the modeling results in terms of projected absolute errors for public schools under Models 1, 2A, 3A, and 4M with a set of specified scenarios for combinations of periodicity choices (intersurvey intervals of 4, 5, or 6 years) and specified cost ratios (variable-to-fixed survey cost ratios of 30:70, 40:60, 50:50, 60:40, and 70:30) – that is, for 15 different scenarios. Detailed results are shown for each policy variable for national-level estimates and selected summary results are shown for the three States as well. These scenarios are referred to as large-sample or full-sample scenarios in that the same sample size is assumed to be obtained at each round of data collection. The nominal base case scenario is the scenario with a periodicity of 5 years and a 50:50 cost ratio. The reference expected obtained sample sizes in the tabulations are labeled as "Ref N" for the modeling runs at the national level and at the State level for the three States.

For public schools, Appendix B provides documentation for an alternating large-and-small-sample design in which a full data collection is carried out a specified intersurvey interval and a smaller data collection is carried out at a mid-point between the two large data collections. This approach is illustrated for Models 3A and 4M by a hypothetical design choice designated as the "Interleaved 3-6-9 Design." Under this design the same sample sizes that are used under the Appendix A base case for a periodicity of 5 years are now used every 6 years for large sample collections and the resource savings are assumed to be used to conduct a one-fifth size data collection 3 years after each large data collection. Detailed modeling results in terms of projected absolute errors (rel *p.a.e.*) are shown at the national level for the U.S. as a whole and summary results are shown for the States of California, Iowa, and New York as well. At the national level, variable-by-variable detail is shown for all seven possible cost ratios. The summary sheets display relative *p.a.e.* results for the cost ratios of 30:70, 50:50, and 70:30.

For private schools, Appendix C provides modeling results (at the national level only) under Models 1, 2A, 3A, and 4M for the four policy variables that are specific to private schools. Again all 15 scenarios (periodicities of 4, 5, or 6 years and five cost ratios) were used.

In Appendix D, the alternating large-and-small-sample design ("Interleaved 3-6-9 Design") was applied to private schools (at the national level only) under Models 3A and 4M for the four policy variables. The national-level summary sheet displays relative *p.a.e.* results for three of the five cost ratios, namely, 30:70, 50:50, and 70:30.

Part II – Error Projections for Selected Models, Policy Variables, Cost Ratios, and Periodicities

Appendix A

Projected Absolute Errors for Large-Sample Scenarios with Periodicities of 4, 5, and 6 Years

Public Schools: National-level U.S. and States of California, Iowa, and New York

SASS Results, Estimates, and Projected Absolute Errors (U.S.) Public Schools
Large-Sample Scenarios with Periodicities of 4, 5, or 6 Years
under Models 1, 2A, 3A, 4M

[SASS Results] [Estimates]

Item	Source	1987 - 88 N*	1987 - 88 N	1987 - 88 Mean	1987 - 88 Std Dev	1990 - 91 N*	1990 - 91 N	1990 - 91 Mean	1990 - 91 Std Dev	1993 - 94 N*	1993 - 94 N	1993 - 94 Mean	1993 - 94 Std Dev	Pooled Mean	Estim Std Dev	Avg D
#1	School (Pub)	8,326	4,659	94.527	128.412	8,969	5,458	101.586	150.210	8,767	4,787	117.660	169.070	104.591	150.153	3.855
#4	School (Pub)	8,326	8,326	2.952	4.155	8,969	8,969	3.477	3.839					3.214	4.000	0.175
#6	Adminr (Pub & Pri)	10,955	10,955	0.088	0.284	11,811	11,811	0.091	0.287	11,841	11,841	0.105	0.306	0.095	0.292	0.003
#7A	School (Pub)	8,326	8,326	17.540	5.101	8,969	8,825	16.512	5.666	8,767	8,551	16.884	5.052	16.979	5.280	0.234
#7B	School (Pri)	2,459	2,459	15.793	7.343	2,620	2,505	14.749	6.543	2,585	2,426	16.480	30.485	15.674	18.494	0.463
#8A	School (Pub)	8,326	8,326	0.993	0.081	8,969	8,969	0.991	0.092	8,767	8,767	0.994	0.080	0.993	0.084	0.001
#8B	School (Pri)	2,459	2,459	0.838	0.368	2,620	2,620	0.844	0.363	2,585	2,585	0.841	0.365	0.841	0.366	0.001
#9	Adminr (Pub)	8,519	8,519	0.955	0.207	9,054	9,054	0.979	0.145	9,098	9,098	0.981	0.136	0.972	0.166	0.004
#10A	Teacher (Pub)	40,593	40,593	0.351	0.477	46,705	46,705	0.396	0.489	47,105	47,105	0.410	0.492	0.386	0.486	0.010
#10B	Teacher (Pri)	6,764	6,764	0.212	0.409	6,642	6,642	0.301	0.459	8,372	8,372	0.295	0.456	0.269	0.442	0.016
#11A	Teacher (Pub)	40,593	40,593	0.034	0.182	46,705	46,705	0.032	0.175	47,105	47,105	0.036	0.186	0.034	0.181	0.001
#11B	Teacher (Pri)	6,764	6,764	0.079	0.270	6,642	6,642	0.057	0.232	8,372	8,372	0.057	0.232	0.065	0.246	0.004

* denotes actual sample size.

[Projected Absolute Errors]

Item	Source	Ref N	Rel p.a.e. Mod 1 p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 2A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 3A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 4M p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs
#1	School (Pub)	9,000	0.069	0.086	0.103	0.037	0.041	0.047	0.044	0.048	0.052	0.036	0.040	0.044
#4	School (Pub)	9,000	0.093	0.119	0.146	0.052	0.058	0.067	0.057	0.064	0.070	0.049	0.056	0.063
#6	Adminr (Pub & Pri)	11,500	0.069	0.081	0.093	0.035	0.038	0.042	0.050	0.052	0.053	0.037	0.039	0.041
#7A	School (Pub)	9,000	0.024	0.030	0.037	0.013	0.015	0.017	0.014	0.016	0.018	0.012	0.014	0.016
#7B	School (Pri)													
#8A	School (Pub)	9,000	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
#8B	School (Pri)													
#9	Adminr (Pub)	9,000	0.008	0.010	0.012	0.005	0.005	0.006	0.005	0.006	0.006	0.004	0.005	0.005
#10A	Teacher (Pub)	48,000	0.043	0.055	0.067	0.024	0.027	0.031	0.026	0.029	0.032	0.022	0.026	0.029
#10B	Teacher (Pri)													
#11A	Teacher (Pub)	48,000	0.074	0.089	0.105	0.039	0.042	0.048	0.051	0.054	0.057	0.039	0.042	0.045
#11B	Teacher (Pri)													
Avg			0.029	0.036	0.043	0.016	0.017	0.019	0.019	0.021	0.022	0.015	0.017	0.018

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Projected Absolute Errors (US)

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 1] (Pooled Mean = 104.591, Estim Std Dev = 150.153, Avg D = 3.855)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	1.828	1.583	1.416	1.292	1.196	1.635	1.416	1.266	1.156	1.070	1.492	1.292	1.156	1.055	0.977
2nd Year	5.683	5.438	5.271	5.148	5.052	5.490	5.271	5.122	5.011	4.926	5.348	5.148	5.011	4.911	4.832
3rd Year	9.539	9.294	9.127	9.003	8.907	9.346	9.127	8.977	8.867	8.781	9.203	9.003	8.867	8.766	8.688
4th Year	13.394	13.149	12.982	12.859	12.763	13.201	12.982	12.833	12.722	12.637	13.059	12.859	12.722	12.622	12.543
5th Year						17.057	16.838	16.688	16.578	16.492	16.914	16.714	16.578	16.477	16.399
6th Year											20.770	20.570	20.433	20.333	20.254
Avg p.a.e.	7.611	7.366	7.199	7.076	6.980	9.346	9.127	8.977	8.867	8.781	11.131	10.931	10.795	10.694	10.616
Rel avg	0.073	0.070	0.069	0.068	0.067	0.089	0.087	0.086	0.085	0.084	0.106	0.105	0.103	0.102	0.101

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	1.828	1.583	1.416	1.292	1.196	1.635	1.416	1.266	1.156	1.070	1.492	1.292	1.156	1.055	0.977
2nd Year	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855	3.855
3rd Year	4.769	4.647	4.563	4.502	4.454	4.673	4.563	4.489	4.433	4.391	4.602	4.502	4.433	4.383	4.344
4th Year	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783	5.783
5th Year						6.396	6.314	6.258	6.217	6.185	6.343	6.268	6.217	6.179	6.150
6th Year											8.348	8.198	8.096	8.020	7.962
Avg p.a.e.	4.059	3.967	3.904	3.858	3.822	4.468	4.386	4.330	4.289	4.257	5.071	4.983	4.923	4.879	4.845
Rel avg	0.039	0.038	0.037	0.037	0.037	0.043	0.042	0.041	0.041	0.041	0.048	0.048	0.047	0.047	0.046

Projected Absolute Errors (US)

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 3A] **(Pooled Mean = 104.591, Estim Std Dev = 150.153, Avg D = 3.855)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	1.828	1.583	1.416	1.292	1.196	1.635	1.416	1.266	1.156	1.070	1.492	1.292	1.156	1.055	0.977
2nd Year	4.912	4.667	4.500	4.377	4.281	4.719	4.500	4.351	4.240	4.155	4.577	4.377	4.240	4.140	4.061
3rd Year	6.190	5.945	5.778	5.654	5.558	5.997	5.778	5.628	5.518	5.432	5.854	5.654	5.518	5.417	5.339
4th Year	7.170	6.925	6.758	6.635	6.539	6.977	6.758	6.608	6.498	6.412	6.835	6.635	6.498	6.397	6.319
5th Year						7.803	7.584	7.435	7.325	7.239	7.661	7.461	7.325	7.224	7.146
6th Year											8.389	8.189	8.053	7.952	7.874
Avg p.a.e.	5.025	4.780	4.613	4.489	4.394	5.426	5.207	5.058	4.947	4.862	5.801	5.601	5.465	5.364	5.286
Rel avg	0.048	0.046	0.044	0.043	0.042	0.052	0.050	0.048	0.047	0.046	0.055	0.054	0.052	0.051	0.051

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	1.828	1.583	1.416	1.292	1.196	1.635	1.416	1.266	1.156	1.070	1.492	1.292	1.156	1.055	0.977
2nd Year	3.585	3.467	3.394	3.344	3.308	3.491	3.394	3.334	3.294	3.265	3.426	3.344	3.294	3.260	3.235
3rd Year	4.729	4.640	4.586	4.549	4.523	4.658	4.586	4.542	4.513	4.491	4.610	4.549	4.513	4.488	4.470
4th Year	5.646	5.572	5.527	5.496	5.475	5.587	5.527	5.490	5.466	5.448	5.547	5.496	5.466	5.446	5.431
5th Year						6.382	6.329	6.297	6.276	6.261	6.347	6.303	6.276	6.258	6.246
6th Year											7.056	7.017	6.993	6.977	6.966
Avg p.a.e.	3.947	3.815	3.731	3.671	3.626	4.350	4.250	4.186	4.141	4.107	4.746	4.667	4.616	4.581	4.554
Rel avg	0.038	0.036	0.036	0.035	0.035	0.042	0.041	0.040	0.040	0.039	0.045	0.045	0.044	0.044	0.044

Projected Absolute Errors (US)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 1] **(Pooled Mean = 3.214, Estim Std Dev = 4.000, Avg D = 0.175)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.049	0.042	0.038	0.034	0.032	0.044	0.038	0.034	0.031	0.029	0.040	0.034	0.031	0.028	0.026
2nd Year	0.224	0.217	0.213	0.209	0.207	0.218	0.213	0.209	0.206	0.203	0.215	0.209	0.206	0.203	0.201
3rd Year	0.399	0.392	0.388	0.384	0.382	0.393	0.388	0.384	0.381	0.378	0.390	0.384	0.381	0.378	0.376
4th Year	0.573	0.567	0.562	0.559	0.557	0.568	0.562	0.558	0.556	0.553	0.564	0.559	0.556	0.553	0.551
5th Year						0.743	0.737	0.733	0.730	0.728	0.739	0.734	0.730	0.728	0.726
6th Year											0.914	0.909	0.905	0.903	0.901
Avg p.a.e.	0.311	0.305	0.300	0.297	0.294	0.393	0.388	0.384	0.381	0.378	0.477	0.472	0.468	0.465	0.463
Rel avg	0.097	0.095	0.093	0.092	0.092	0.122	0.121	0.119	0.118	0.118	0.148	0.147	0.146	0.145	0.144

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.049	0.042	0.038	0.034	0.032	0.044	0.038	0.034	0.031	0.029	0.040	0.034	0.031	0.028	0.026
2nd Year	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
3rd Year	0.199	0.196	0.194	0.192	0.191	0.197	0.194	0.192	0.190	0.189	0.195	0.192	0.190	0.189	0.188
4th Year	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
5th Year						0.279	0.277	0.275	0.274	0.273	0.277	0.275	0.274	0.273	0.272
6th Year											0.358	0.354	0.351	0.349	0.347
Avg p.a.e.	0.171	0.169	0.167	0.166	0.165	0.191	0.189	0.188	0.186	0.186	0.218	0.215	0.214	0.213	0.212
Rel avg	0.053	0.053	0.052	0.052	0.051	0.059	0.059	0.058	0.058	0.058	0.068	0.067	0.067	0.066	0.066

Projected Absolute Errors (US)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] (Pooled Mean = 3.214, Estim Std Dev = 4.000, Avg D = 0.175)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.049	0.042	0.038	0.034	0.032	0.044	0.038	0.034	0.031	0.029	0.040	0.034	0.031	0.028	0.026
2nd Year	0.189	0.182	0.178	0.174	0.172	0.183	0.178	0.174	0.171	0.168	0.180	0.174	0.171	0.168	0.166
3rd Year	0.247	0.240	0.236	0.232	0.230	0.241	0.236	0.232	0.229	0.226	0.238	0.232	0.229	0.226	0.224
4th Year	0.291	0.285	0.280	0.277	0.274	0.286	0.280	0.276	0.273	0.271	0.282	0.277	0.273	0.270	0.268
5th Year						0.323	0.318	0.314	0.311	0.308	0.320	0.314	0.311	0.308	0.306
6th Year											0.353	0.347	0.344	0.341	0.339
Avg p.a.e.	0.194	0.187	0.183	0.179	0.177	0.216	0.210	0.206	0.203	0.201	0.235	0.230	0.226	0.224	0.222
Rel avg	0.060	0.058	0.057	0.056	0.055	0.067	0.065	0.064	0.063	0.062	0.073	0.072	0.070	0.070	0.069

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.049	0.042	0.038	0.034	0.032	0.044	0.038	0.034	0.031	0.029	0.040	0.034	0.031	0.028	0.026
2nd Year	0.148	0.146	0.145	0.144	0.144	0.147	0.145	0.144	0.143	0.143	0.145	0.144	0.143	0.143	0.142
3rd Year	0.204	0.202	0.201	0.201	0.200	0.203	0.201	0.201	0.200	0.200	0.202	0.201	0.200	0.200	0.200
4th Year	0.247	0.246	0.245	0.245	0.244	0.246	0.245	0.245	0.244	0.244	0.246	0.245	0.244	0.244	0.244
5th Year						0.283	0.282	0.282	0.282	0.281	0.283	0.282	0.282	0.281	0.281
6th Year											0.315	0.315	0.314	0.314	0.314
Avg p.a.e.	0.162	0.159	0.157	0.156	0.155	0.184	0.182	0.181	0.180	0.179	0.205	0.203	0.202	0.202	0.201
Rel avg	0.050	0.050	0.049	0.049	0.048	0.057	0.057	0.056	0.056	0.056	0.064	0.063	0.063	0.063	0.063

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Projected Absolute Errors (US)

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 1] (Pooled Mean = 0.095, Estim Std Dev = 0.292, Avg D = 0.003)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,520	7,360	9,200	11,040	12,880	6,900	9,200	11,500	13,800	16,100	8,280	11,040	13,800	16,560	19,320
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.006	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004
3rd Year	0.009	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.007
4th Year	0.011	0.011	0.011	0.010	0.010	0.011	0.011	0.010	0.010	0.010	0.011	0.010	0.010	0.010	0.010
5th Year						0.014	0.013	0.013	0.013	0.013	0.014	0.013	0.013	0.013	0.013
6th Year											0.016	0.016	0.016	0.016	0.015
Avg p.a.e.	0.007	0.007	0.007	0.006	0.006	0.008	0.008	0.008	0.007	0.007	0.009	0.009	0.009	0.009	0.009
Rel p.a.e.	0.077	0.072	0.069	0.067	0.065	0.088	0.084	0.081	0.079	0.077	0.100	0.096	0.093	0.092	0.090

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,520	7,360	9,200	11,040	12,880	6,900	9,200	11,500	13,800	16,100	8,280	11,040	13,800	16,560	19,320
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
3rd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
4th Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
5th Year						0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
6th Year											0.007	0.007	0.007	0.006	0.006
Avg p.a.e.	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.004
Rel p.a.e.	0.038	0.036	0.035	0.034	0.034	0.040	0.039	0.038	0.037	0.036	0.045	0.043	0.042	0.042	0.041

Projected Absolute Errors (US)

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] (Pooled Mean = 0.095, Estim Std Dev = 0.292, Avg D = 0.003)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,520	7,360	9,200	11,040	12,880	6,900	9,200	11,500	13,800	16,100	8,280	11,040	13,800	16,560	19,320
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
3rd Year	0.006	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005
4th Year	0.007	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005
5th Year						0.007	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006
6th Year											0.007	0.007	0.007	0.007	0.007
Avg p.a.e.	0.005	0.005	0.005	0.004	0.004	0.006	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005
Rel p.a.e.	0.057	0.053	0.050	0.048	0.046	0.058	0.054	0.052	0.050	0.048	0.060	0.056	0.053	0.052	0.050

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,520	7,360	9,200	11,040	12,880	6,900	9,200	11,500	13,800	16,100	8,280	11,040	13,800	16,560	19,320
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
3rd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
4th Year	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
5th Year						0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
6th Year											0.006	0.005	0.005	0.005	0.005
Avg p.a.e.	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.004
Rel p.a.e.	0.043	0.040	0.037	0.036	0.035	0.043	0.041	0.039	0.038	0.037	0.044	0.042	0.041	0.040	0.039

Projected Absolute Errors (US)

Item #7A - Number of students per FTE teacher. (public schools)

[Model 1] (Pooled Mean = 16.979, Estim Std Dev = 5.280, Avg D = 0.234)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.064	0.056	0.050	0.045	0.042	0.057	0.050	0.045	0.041	0.038	0.052	0.045	0.041	0.037	0.034
2nd Year	0.298	0.289	0.283	0.279	0.276	0.291	0.283	0.278	0.274	0.271	0.286	0.279	0.274	0.271	0.268
3rd Year	0.531	0.523	0.517	0.512	0.509	0.525	0.517	0.512	0.508	0.505	0.520	0.512	0.508	0.504	0.501
4th Year	0.765	0.756	0.750	0.746	0.743	0.758	0.750	0.745	0.741	0.738	0.753	0.746	0.741	0.738	0.735
5th Year						0.992	0.984	0.979	0.975	0.972	0.987	0.980	0.975	0.971	0.968
6th Year											1.220	1.213	1.208	1.205	1.202
Avg p.a.e.	0.415	0.406	0.400	0.396	0.392	0.525	0.517	0.512	0.508	0.505	0.636	0.629	0.624	0.621	0.618
Rel p.a.e.	0.024	0.024	0.024	0.023	0.023	0.031	0.030	0.030	0.030	0.030	0.037	0.037	0.037	0.037	0.036

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.064	0.056	0.050	0.045	0.042	0.057	0.050	0.045	0.041	0.038	0.052	0.045	0.041	0.037	0.034
2nd Year	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234	0.234
3rd Year	0.266	0.261	0.258	0.256	0.255	0.262	0.258	0.256	0.254	0.252	0.260	0.256	0.254	0.252	0.251
4th Year	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350	0.350
5th Year						0.372	0.369	0.367	0.366	0.364	0.370	0.367	0.366	0.364	0.363
6th Year											0.477	0.472	0.468	0.466	0.464
Avg p.a.e.	0.228	0.225	0.223	0.221	0.220	0.255	0.252	0.250	0.249	0.248	0.291	0.287	0.285	0.284	0.283
Rel p.a.e.	0.013	0.013	0.013	0.013	0.013	0.015	0.015	0.015	0.015	0.015	0.017	0.017	0.017	0.017	0.017

Projected Absolute Errors (US)

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 16.979, Estim Std Dev = 5.280, Avg D = 0.234)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.064	0.056	0.050	0.045	0.042	0.057	0.050	0.045	0.041	0.038	0.052	0.045	0.041	0.037	0.034
2nd Year	0.251	0.242	0.237	0.232	0.229	0.244	0.237	0.231	0.227	0.224	0.239	0.232	0.227	0.224	0.221
3rd Year	0.328	0.320	0.314	0.310	0.306	0.322	0.314	0.309	0.305	0.302	0.317	0.310	0.305	0.301	0.299
4th Year	0.388	0.379	0.373	0.369	0.366	0.381	0.373	0.368	0.364	0.361	0.376	0.369	0.364	0.361	0.358
5th Year						0.431	0.423	0.418	0.414	0.411	0.426	0.419	0.414	0.411	0.408
6th Year											0.470	0.463	0.458	0.455	0.452
Avg p.a.e.	0.258	0.249	0.243	0.239	0.236	0.287	0.279	0.274	0.270	0.267	0.313	0.306	0.302	0.298	0.295
Rel p.a.e.	0.015	0.015	0.014	0.014	0.014	0.017	0.016	0.016	0.016	0.016	0.018	0.018	0.018	0.018	0.017

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.064	0.056	0.050	0.045	0.042	0.057	0.050	0.045	0.041	0.038	0.052	0.045	0.041	0.037	0.034
2nd Year	0.198	0.195	0.193	0.192	0.191	0.195	0.193	0.192	0.191	0.191	0.194	0.192	0.191	0.190	0.190
3rd Year	0.272	0.270	0.269	0.268	0.268	0.270	0.269	0.268	0.267	0.267	0.269	0.268	0.267	0.267	0.266
4th Year	0.330	0.328	0.327	0.327	0.326	0.329	0.327	0.327	0.326	0.326	0.328	0.327	0.326	0.326	0.325
5th Year						0.378	0.377	0.376	0.376	0.376	0.377	0.376	0.376	0.375	0.375
6th Year											0.421	0.420	0.420	0.419	0.419
Avg p.a.e.	0.216	0.212	0.210	0.208	0.207	0.246	0.243	0.241	0.240	0.239	0.274	0.272	0.270	0.269	0.268
Rel p.a.e.	0.013	0.012	0.012	0.012	0.012	0.014	0.014	0.014	0.014	0.014	0.016	0.016	0.016	0.016	0.016

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Projected Absolute Errors (US)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)

[Model 1] **(Pooled Mean = 0.993, Estim Std Dev = 0.084, Avg D = 0.001)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
3rd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
4th Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
5th Year						0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
6th Year											0.004	0.004	0.004	0.004	0.004
Avg p.a.e.	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
Rel p.a.e.	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
4th Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
5th Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
6th Year											0.002	0.002	0.002	0.002	0.002
Avg p.a.e.	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Rel p.a.e.	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Projected Absolute Errors (US)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)

[Model 3A] **(Pooled Mean = 0.993, Estim Std Dev = 0.084, Avg D = 0.001)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
6th Year											0.002	0.002	0.002	0.002	0.002
Avg p.a.e.	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
Rel p.a.e.	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
4th Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
5th Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
6th Year											0.001	0.001	0.001	0.001	0.001
Avg p.a.e.	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Rel p.a.e.	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Projected Absolute Errors (US)

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 1] (Pooled Mean = 0.972, Estim Std Dev = 0.166, Avg D = 0.004)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
2nd Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005
3rd Year	0.011	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
4th Year	0.015	0.015	0.015	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.015	0.014	0.014	0.014	0.014
5th Year						0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
6th Year											0.023	0.023	0.023	0.023	0.023
Avg p.a.e.	0.009	0.008	0.008	0.008	0.008	0.010	0.010	0.010	0.010	0.010	0.012	0.012	0.012	0.012	0.012
Rel p.a.e.	0.009	0.008	0.008	0.008	0.008	0.011	0.011	0.010	0.010	0.010	0.013	0.013	0.012	0.012	0.012

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
2nd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3rd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4th Year	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
5th Year						0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
6th Year											0.009	0.009	0.009	0.009	0.009
Avg p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.005	0.005
Rel p.a.e.	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006

Projected Absolute Errors (US)

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.972, Estim Std Dev = 0.166, Avg D = 0.004)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
2nd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
3rd Year	0.007	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006
4th Year	0.008	0.008	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
5th Year						0.009	0.009	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.008
6th Year											0.009	0.009	0.009	0.009	0.009
Avg p.a.e.	0.006	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.006
Rel p.a.e.	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	4,320	5,760	7,200	8,640	10,080	5,400	7,200	9,000	10,800	12,600	6,480	8,640	10,800	12,960	15,120
1st Year	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
2nd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3rd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4th Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
5th Year						0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
6th Year											0.008	0.008	0.008	0.008	0.008
Avg p.a.e.	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Rel p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005

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Projected Absolute Errors (US)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 1] (Pooled Mean = 0.386, Estim Std Dev = 0.486, Avg D = 0.010)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
2nd Year	0.012	0.012	0.012	0.012	0.011	0.012	0.012	0.011	0.011	0.011	0.012	0.012	0.011	0.011	0.011
3rd Year	0.022	0.022	0.021	0.021	0.021	0.022	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
4th Year	0.032	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.030
5th Year						0.041	0.041	0.041	0.040	0.040	0.041	0.041	0.040	0.040	0.040
6th Year											0.051	0.050	0.050	0.050	0.050
Avg p.a.e.	0.017	0.017	0.017	0.016	0.016	0.022	0.021	0.021	0.021	0.021	0.026	0.026	0.026	0.026	0.026
Rel p.a.e.	0.044	0.043	0.043	0.042	0.042	0.056	0.055	0.055	0.054	0.054	0.068	0.068	0.067	0.067	0.066

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
2nd Year	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
3rd Year	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.011	0.011	0.011	0.010	0.010
4th Year	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
5th Year						0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
6th Year											0.020	0.020	0.019	0.019	0.019
Avg p.a.e.	0.009	0.009	0.009	0.009	0.009	0.011	0.010	0.010	0.010	0.010	0.012	0.012	0.012	0.012	0.012
Rel p.a.e.	0.024	0.024	0.024	0.024	0.024	0.027	0.027	0.027	0.027	0.027	0.031	0.031	0.031	0.030	0.030

Projected Absolute Errors (US)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] **(Pooled Mean = 0.386, Estim Std Dev = 0.486, Avg D = 0.010)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
2nd Year	0.010	0.010	0.010	0.010	0.009	0.010	0.010	0.010	0.009	0.009	0.010	0.010	0.009	0.009	0.009
3rd Year	0.014	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.012	0.013	0.013	0.013	0.012	0.012
4th Year	0.016	0.016	0.015	0.015	0.015	0.016	0.015	0.015	0.015	0.015	0.016	0.015	0.015	0.015	0.015
5th Year						0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017
6th Year											0.019	0.019	0.019	0.019	0.019
Avg p.a.e.	0.011	0.010	0.010	0.010	0.010	0.012	0.012	0.011	0.011	0.011	0.013	0.013	0.012	0.012	0.012
Rel p.a.e.	0.027	0.027	0.026	0.026	0.025	0.031	0.030	0.029	0.029	0.029	0.034	0.033	0.032	0.032	0.032

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
2nd Year	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
3rd Year	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
4th Year	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013
5th Year						0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
6th Year											0.017	0.017	0.017	0.017	0.017
Avg p.a.e.	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
Rel p.a.e.	0.023	0.023	0.022	0.022	0.022	0.026	0.026	0.026	0.026	0.026	0.029	0.029	0.029	0.029	0.029

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Projected Absolute Errors (US)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)

[Model 1] (Pooled Mean = 0.034, Estim Std Dev = 0.181, Avg D = 0.001)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
3rd Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
4th Year	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
5th Year						0.006	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005
6th Year											0.007	0.007	0.007	0.006	0.006
Avg p.a.e.	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.003
Rel p.a.e.	0.081	0.077	0.074	0.072	0.071	0.095	0.092	0.089	0.088	0.086	0.110	0.107	0.105	0.104	0.102

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.001	0.001	0.001
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
6th Year											0.003	0.003	0.003	0.003	0.003
Avg p.a.e.	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
Rel p.a.e.	0.041	0.040	0.039	0.038	0.037	0.044	0.043	0.042	0.042	0.041	0.050	0.049	0.048	0.047	0.047

Projected Absolute Errors (US)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)

[Model 3A] (Pooled Mean = 0.034, Estim Std Dev = 0.181, Avg D = 0.001)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001
3rd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
4th Year	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002
6th Year											0.003	0.003	0.003	0.003	0.003
Avg p.a.e.	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Rel p.a.e.	0.057	0.053	0.051	0.049	0.047	0.060	0.056	0.054	0.052	0.051	0.062	0.059	0.057	0.055	0.054

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	23,040	30,720	38,400	46,080	53,760	28,800	38,400	48,000	57,600	67,200	34,560	46,080	57,600	69,120	80,640
1st Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
6th Year											0.002	0.002	0.002	0.002	0.002
Avg p.a.e.	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.001
Rel p.a.e.	0.043	0.041	0.039	0.038	0.037	0.045	0.043	0.042	0.041	0.040	0.048	0.046	0.045	0.044	0.044

SASS Results, Estimates, and Projected Absolute Errors (California) Public Schools
Large-Sample Scenarios with Periodicities of 4, 5, or 6 Years
under Models 1, 2A, 3A, 4M

[SASS Results] [Estimates]

Item	Source	1987 - 88 N*	1987 - 88 N	1987 - 88 Mean	1987 - 88 Std Dev	1990 - 91 N*	1990 - 91 N	1990 - 91 Mean	1990 - 91 Std Dev	1993 - 94 N*	1993 - 94 N	1993 - 94 Mean	1993 - 94 Std Dev	Pooled Mean	Estim Std Dev	Avg D
#1	School (Pub)	556	253	259.426	270.042	296	155	271.292	304.283	352	159	313.296	309.930	281.338	295.278	8.978
#4	School (Pub)	556	556	2.962	3.913	296	296	4.027	3.865					3.494	3.889	0.355
#6	Adminr (Pub & Pri)	783	783	0.100	0.301	682	682	0.117	0.321	700	700	0.131	0.337	0.116	0.320	0.005
#7A	School (Pub)	556	556	22.823	5.458	296	285	23.124	7.918	352	319	23.548	5.028	23.165	6.265	0.121
#7B	School (Pri)	213	213	17.071	8.206	364	350	16.357	8.213	265	252	17.973	10.392	17.134	8.996	0.389
#8A	School (Pub)	556	556	0.988	0.110	296	296	0.980	0.140	352	352	0.985	0.123	0.984	0.125	0.002
#8B	School (Pri)	213	213	0.884	0.320	364	364	0.921	0.270	265	265	0.956	0.206	0.920	0.269	0.012
#9	Adminr (Pub)	580	580	0.889	0.314	300	300	0.961	0.194	380	380	0.935	0.246	0.929	0.256	0.016
#10A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,833	1,833	0.402	0.490	2,124	2,124	0.405	0.491	0.404	0.491	0.001
#10B	Teacher (Pri)	N/A	N/A	N/A	N/A	838	838	0.295	0.456	962	962	0.291	0.454	0.293	0.455	0.001
#11A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,833	1,833	0.042	0.200	2,124	2,124	0.044	0.206	0.043	0.203	0.001
#11B	Teacher (Pri)	N/A	N/A	N/A	N/A	838	838	0.055	0.228	962	962	0.075	0.263	0.065	0.246	0.007

* denotes actual sample size.

[Projected Absolute Errors]

Item	Source	Ref N	Rel p.a.e. Mod 1 p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 2A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 3A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 4M p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs
#1	School (Pub)	350	0.098	0.109	0.121	0.047	0.049	0.054	0.077	0.076	0.077	0.059	0.057	0.057
#4	School (Pub)	350	0.205	0.251	0.297	0.109	0.119	0.135	0.137	0.147	0.157	0.107	0.117	0.127
#6	Adminr (Pub & Pri)	700	0.158	0.170	0.185	0.073	0.075	0.083	0.129	0.126	0.125	0.102	0.096	0.093
#7A	School (Pub)	350	0.021	0.022	0.024	0.009	0.010	0.011	0.017	0.017	0.016	0.014	0.013	0.012
#7B	School (Pri)													
#8A	School (Pub)	350	0.009	0.010	0.010	0.004	0.004	0.005	0.008	0.007	0.007	0.006	0.006	0.006
#8B	School (Pri)													
#9	Admin (Pub)	350	0.039	0.047	0.054	0.020	0.022	0.025	0.028	0.029	0.030	0.021	0.022	0.023
#10A	Teacher (Pub)	2,100	0.028	0.028	0.027	0.012	0.011	0.012	0.026	0.024	0.023	0.024	0.022	0.020
#10B	Teacher (Pri)													
#11A	Teacher (Pub)	2,100	0.120	0.120	0.122	0.051	0.050	0.054	0.108	0.101	0.096	0.094	0.085	0.079
#11B	Teacher (Pri)													
Avg			0.055	0.059	0.064	0.025	0.026	0.029	0.044	0.043	0.043	0.036	0.034	0.034

Projected Absolute Errors (State)

Item #1 - Number of students served by chapter 1 services. (public schools)
(Pooled Mean = 281.338, Estim Std Dev = 295.278, Avg D = 8.978)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	18.225	15.783	14.117	12.887	11.931	16.301	14.117	12.627	11.526	10.671	14.881	12.887	11.526	10.522	9.742
2nd Year	27.203	24.7[illegible]	23.095	21.865	20.909	25.279	23.095	21.605	20.505	19.650	23.859	21.865	20.505	19.500	18.720
3rd Year	36.182	33.740	32.074	30.844	29.888	34.257	32.074	30.583	29.483	28.628	32.837	30.844	29.483	28.479	27.698
4th Year	45.160	42.718	41.052	39.822	38.866	43.236	41.052	39.561	38.461	37.606	41.815	39.822	38.461	37.457	36.676
5th Year						52.214	50.030	48.540	47.440	46.585	50.794	48.800	47.440	46.435	45.655
6th Year											59.772	57.778	56.418	55.414	54.633
Avg p.a.e.	31.692	29.251	27.584	26.354	25.398	34.257	32.074	30.583	29.483	28.628	37.326	35.333	3[illegible].972	32.968	32.187
Rel avg	0.113	0.104	0.098	0.094	0.090	0.122	0.114	0.109	0.105	0.102	0.133	0.126	0.121	0.117	0.114

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	18.225	15.783	14.117	12.887	11.931	16.301	14.117	12.627	11.526	10.671	14.881	12.887	11.526	10.522	9.742
2nd Year	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978	8.978
3rd Year	18.091	16.870	16.037	15.422	14.944	17.129	16.037	15.292	14.742	14.314	16.419	15.422	14.742	14.239	13.849
4th Year	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467	13.467
5th Year						19.580	18.761	18.202	17.790	17.469	19.048	18.300	17.790	17.413	17.121
6th Year											27.995	26.500	25.479	24.726	24.141
Avg p.a.e.	14.690	13.775	13.150	12.689	12.330	15.091	14.272	13.713	13.301	12.980	16.798	15.926	15.330	14.891	14.550
Rel avg	0.052	0.049	0.047	0.045	0.044	0.054	0.051	0.049	0.047	0.046	0.060	0.057	0.054	0.053	0.052

Projected Absolute Errors (State)

Item #1 - Number of students served by chapter 1 services. (public schools)
(Pooled Mean = 281.338, Estim Std Dev = 295.278, Avg D = 8.978)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	18.225	15.783	14.117	12.887	11.931	16.301	14.117	12.627	11.526	10.671	14.881	12.887	11.526	10.522	9.742
2nd Year	25.408	22.966	21.300	20.070	19.114	23.484	21.300	19.809	18.709	17.854	22.063	20.070	18.709	17.705	16.924
3rd Year	28.383	25.941	24.275	23.045	22.089	26.459	24.275	22.784	21.684	20.829	25.038	23.045	21.684	20.680	19.899
4th Year	30.666	28.224	26.558	25.328	24.372	28.742	26.558	25.067	23.967	23.112	27.321	25.328	23.967	22.963	22.182
5th Year						30.666	28.482	26.992	25.892	25.037	29.246	27.252	25.892	24.887	24.107
6th Year											30.941	28.948	27.587	26.583	25.802
Avg p.a.e.	25.670	23.229	21.562	20.332	19.376	25.130	22.946	21.456	20.356	19.501	24.915	22.922	21.561	20.557	19.776
Rel avg	0.091	0.083	0.077	0.072	0.069	0.089	0.082	0.076	0.072	0.069	0.089	0.081	0.077	0.073	0.070

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	18.225	15.783	14.117	12.887	11.931	16.301	14.117	12.627	11.526	10.671	14.881	12.887	11.526	10.522	9.742
2nd Year	19.589	17.341	15.839	14.753	13.926	17.813	15.839	14.527	13.581	12.864	16.523	14.753	13.581	12.740	12.103
3rd Year	20.865	18.769	17.392	16.409	15.669	19.207	17.392	16.205	15.364	14.733	18.017	16.409	15.364	14.625	14.074
4th Year	22.066	20.097	18.816	17.912	17.237	20.506	18.816	17.726	16.960	16.391	19.396	17.912	16.960	16.294	15.801
5th Year						21.727	20.141	19.126	18.418	17.895	20.683	19.299	18.418	17.807	17.357
6th Year											21.895	20.592	19.769	19.201	18.784
Avg p.a.e.	20.186	17.998	16.541	15.490	14.691	19.111	17.261	16.042	15.170	14.511	18.566	16.975	15.936	15.198	14.644
Rel avg	0.072	0.064	0.059	0.055	0.052	0.068	0.061	0.057	0.054	0.052	0.066	0.060	0.057	0.054	0.052

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Projected Absolute Errors (State)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)
(Pooled Mean = 3.494, Estim Std Dev = 3.889, Avg D = 0.335)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.240	0.208	0.186	0.170	0.157	0.215	0.186	0.166	0.152	0.141	0.196	0.170	0.152	0.139	0.128
2nd Year	0.595	0.563	0.541	0.524	0.512	0.569	0.541	0.521	0.507	0.495	0.551	0.524	0.507	0.493	0.483
3rd Year	0.950	0.917	0.895	0.879	0.867	0.924	0.895	0.876	0.861	0.850	0.906	0.879	0.861	0.848	0.838
4th Year	1.304	1.272	1.250	1.234	1.221	1.279	1.250	1.231	1.216	1.205	1.260	1.234	1.216	1.203	1.193
5th Year						1.634	1.605	1.585	1.571	1.560	1.615	1.589	1.571	1.558	1.547
6th Year											1.970	1.944	1.926	1.912	1.902
Avg p.a.e.	0.772	0.740	0.718	0.702	0.689	0.924	0.895	0.876	0.861	0.850	1.083	1.057	1.039	1.026	1.015
Rel avg	0.221	0.212	0.205	0.201	0.197	0.264	0.256	0.251	0.247	0.243	0.310	0.302	0.297	0.293	0.291

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.240	0.208	0.186	0.170	0.157	0.215	0.186	0.166	0.152	0.141	0.196	0.170	0.152	0.139	0.128
2nd Year	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355	0.355
3rd Year	0.475	0.459	0.448	0.440	0.433	0.462	0.448	0.438	0.431	0.425	0.453	0.440	0.431	0.424	0.419
4th Year	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532	0.532
5th Year						0.613	0.602	0.595	0.589	0.585	0.606	0.596	0.589	0.584	0.580
6th Year											0.812	0.792	0.779	0.769	0.761
Avg p.a.e.	0.400	0.388	0.380	0.374	0.369	0.435	0.424	0.417	0.412	0.407	0.492	0.481	0.473	0.467	0.463
Rel avg	0.115	0.111	0.109	0.107	0.106	0.125	0.121	0.119	0.118	0.117	0.141	0.138	0.135	0.134	0.132

Projected Absolute Errors (State)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)
(Pooled Mean = 3.494, Estim Std Dev = 3.889, Avg D = 0.335)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.240	0.208	0.186	0.170	0.157	0.215	0.186	0.166	0.152	0.141	0.196	0.170	0.152	0.139	0.128
2nd Year	0.524	0.492	0.470	0.454	0.441	0.499	0.470	0.450	0.436	0.424	0.480	0.454	0.436	0.422	0.412
3rd Year	0.641	0.609	0.587	0.571	0.559	0.616	0.587	0.568	0.553	0.542	0.597	0.571	0.553	0.540	0.530
4th Year	0.732	0.699	0.678	0.661	0.649	0.706	0.678	0.658	0.643	0.632	0.688	0.661	0.643	0.630	0.620
5th Year						0.782	0.754	0.734	0.719	0.708	0.764	0.737	0.719	0.706	0.696
6th Year											0.831	0.804	0.786	0.773	0.763
Avg p.a.e.	0.534	0.502	0.480	0.464	0.451	0.564	0.535	0.515	0.501	0.489	0.592	0.566	0.548	0.535	0.525
Rel avg	0.153	0.144	0.137	0.133	0.129	0.161	0.153	0.147	0.143	0.140	0.170	0.162	0.157	0.153	0.150

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.240	0.208	0.186	0.170	0.157	0.215	0.186	0.166	0.152	0.141	0.196	0.170	0.152	0.139	0.128
2nd Year	0.372	0.352	0.339	0.331	0.324	0.356	0.339	0.329	0.322	0.317	0.345	0.331	0.322	0.316	0.311
3rd Year	0.468	0.452	0.442	0.436	0.431	0.455	0.442	0.434	0.429	0.425	0.447	0.436	0.429	0.425	0.421
4th Year	0.547	0.534	0.526	0.520	0.516	0.536	0.526	0.519	0.514	0.511	0.529	0.520	0.514	0.511	0.508
5th Year						0.607	0.597	0.591	0.588	0.585	0.601	0.592	0.588	0.584	0.582
6th Year											0.664	0.657	0.653	0.650	0.647
Avg p.a.e.	0.407	0.386	0.373	0.364	0.357	0.434	0.418	0.408	0.401	0.396	0.464	0.451	0.443	0.437	0.433
Rel avg	0.116	0.111	0.107	0.104	0.102	0.124	0.120	0.117	0.115	0.113	0.133	0.129	0.127	0.125	0.124

Projected Absolute Errors (State)

Item #6 - Percentage of all schools with minority principals. (public and private schools)
(Pooled Mean = 0.116, Estim Std Dev = 0.320, Avg D = 0.005)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	336	448	560	672	784	420	560	700	840	980	504	672	840	1,008	1,176
1st Year	0.014	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007
2nd Year	0.019	0.017	0.016	0.015	0.014	0.018	0.016	0.015	0.014	0.013	0.016	0.015	0.014	0.013	0.012
3rd Year	0.024	0.022	0.021	0.020	0.019	0.023	0.021	0.020	0.019	0.018	0.021	0.020	0.019	0.018	0.018
4th Year	0.029	0.027	0.026	0.025	0.024	0.028	0.026	0.025	0.024	0.023	0.026	0.025	0.024	0.023	0.023
5th Year						0.033	0.031	0.030	0.029	0.028	0.032	0.030	0.029	0.028	0.028
6th Year											0.037	0.035	0.034	0.033	0.033
Avg p.a.e.	0.022	0.020	0.018	0.017	0.017	0.023	0.021	0.020	0.019	0.018	0.024	0.022	0.021	0.021	0.020
Rel p.a.e.	0.186	0.169	0.158	0.150	0.144	0.195	0.180	0.170	0.163	0.157	0.207	0.194	0.185	0.178	0.173

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	336	448	560	672	784	420	560	700	840	980	504	672	840	1,008	1,176
1st Year	0.014	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007
2nd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
3rd Year	0.012	0.011	0.010	0.010	0.010	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.009
4th Year	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
5th Year						0.012	0.012	0.011	0.011	0.011	0.012	0.011	0.011	0.011	0.010
6th Year											0.018	0.017	0.016	0.015	0.015
Avg p.a.e.	0.010	0.009	0.008	0.008	0.008	0.010	0.009	0.009	0.008	0.008	0.011	0.010	0.010	0.009	0.009
Rel p.a.e.	0.083	0.077	0.073	0.070	0.068	0.084	0.078	0.075	0.072	0.070	0.093	0.087	0.083	0.080	0.078

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Projected Absolute Errors (State)

Item #6 - Percentage of all schools with minority principals. (public and private schools)
(Pooled Mean = 0.116, Estim Std Dev = 0.320, Avg D = 0.005)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	336	448	560	672	784	420	560	700	840	980	504	672	840	1,008	1,176
1st Year	0.014	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007
2nd Year	0.018	0.016	0.015	0.014	0.013	0.017	0.015	0.014	0.013	0.012	0.015	0.014	0.013	0.012	0.011
3rd Year	0.020	0.018	0.017	0.016	0.015	0.018	0.017	0.015	0.015	0.014	0.017	0.016	0.015	0.014	0.013
4th Year	0.021	0.019	0.018	0.017	0.016	0.019	0.018	0.017	0.016	0.015	0.018	0.017	0.016	0.015	0.014
5th Year						0.021	0.019	0.018	0.017	0.016	0.019	0.018	0.017	0.016	0.016
6th Year											0.020	0.019	0.018	0.017	0.016
Avg p.a.e.	0.018	0.016	0.015	0.014	0.013	0.017	0.016	0.015	0.014	0.013	0.017	0.015	0.014	0.014	0.013
Rel p.a.e.	0.156	0.140	0.129	0.121	0.115	0.150	0.136	0.126	0.119	0.113	0.147	0.134	0.125	0.118	0.113

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	336	448	560	672	784	420	560	700	840	980	504	672	840	1,008	1,176
1st Year	0.014	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007
2nd Year	0.015	0.013	0.012	0.011	0.010	0.013	0.012	0.010	0.010	0.009	0.012	0.011	0.010	0.009	0.008
3rd Year	0.015	0.013	0.012	0.011	0.011	0.014	0.012	0.011	0.011	0.010	0.013	0.011	0.011	0.010	0.009
4th Year	0.016	0.014	0.013	0.012	0.011	0.014	0.013	0.012	0.011	0.011	0.013	0.012	0.011	0.011	0.010
5th Year						0.015	0.013	0.013	0.012	0.011	0.014	0.013	0.012	0.011	0.011
6th Year											0.015	0.013	0.013	0.012	0.012
Avg p.a.e.	0.015	0.013	0.012	0.011	0.010	0.014	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.010	0.010
Rel p.a.e.	0.128	0.113	0.102	0.095	0.089	0.118	0.105	0.096	0.090	0.085	0.112	0.101	0.093	0.088	0.084

Projected Absolute Errors (State)

Item #7A - Number of students per FTE teacher. (public schools)
(Pooled Mean = 23.165, Estim Std Dev = 6.265, Avg D = 0.121)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.387	0.335	0.300	0.273	0.253	0.346	0.300	0.268	0.245	0.226	0.316	0.273	0.245	0.223	0.207
2nd Year	0.508	0.456	0.420	0.394	0.374	0.467	0.420	0.389	0.365	0.347	0.437	0.394	0.365	0.344	0.328
3rd Year	0.628	0.577	0.541	0.515	0.495	0.588	0.541	0.510	0.486	0.468	0.557	0.515	0.486	0.465	0.448
4th Year	0.749	0.697	0.662	0.636	0.616	0.708	0.662	0.630	0.607	0.589	0.678	0.636	0.607	0.586	0.569
5th Year						0.829	0.783	0.751	0.728	0.710	0.799	0.757	0.728	0.707	0.690
6th Year											0.920	0.878	0.849	0.827	0.811
Avg p.a.e.	0.568	0.516	0.481	0.455	0.434	0.588	0.541	0.510	0.486	0.468	0.618	0.575	0.547	0.525	0.509
Rel p.a.e.	0.025	0.022	0.021	0.020	0.019	0.025	0.023	0.022	0.021	0.020	0.027	0.025	0.024	0.023	0.022

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.387	0.335	0.300	0.273	0.253	0.346	0.300	0.268	0.245	0.226	0.316	0.273	0.245	0.223	0.207
2nd Year	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121
3rd Year	0.314	0.288	0.271	0.258	0.247	0.294	0.271	0.255	0.243	0.234	0.279	0.258	0.243	0.232	0.224
4th Year	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181	0.181
5th Year						0.311	0.294	0.282	0.273	0.266	0.300	0.284	0.273	0.265	0.259
6th Year											0.463	0.432	0.410	0.394	0.382
Avg p.a.e.	0.251	0.231	0.218	0.208	0.201	0.251	0.233	0.221	0.213	0.206	0.277	0.258	0.245	0.236	0.229
Rel p.a.e.	0.011	0.010	0.009	0.009	0.009	0.011	0.010	0.010	0.009	0.009	0.012	0.011	0.011	0.010	0.010

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Projected Absolute Errors (State)

Item #7A - Number of students per FTE teacher. (public schools)
(Pooled Mean = 23.165, Estim Std Dev = 6.265, Avg D = 0.121)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.387	0.335	0.300	0.273	0.253	0.346	0.300	0.268	0.245	0.226	0.316	0.273	0.245	0.223	0.207
2nd Year	0.483	0.432	0.396	0.370	0.350	0.443	0.396	0.365	0.341	0.323	0.412	0.370	0.341	0.320	0.303
3rd Year	0.523	0.472	0.436	0.410	0.390	0.483	0.436	0.405	0.381	0.363	0.452	0.410	0.381	0.360	0.343
4th Year	0.554	0.502	0.467	0.441	0.421	0.513	0.467	0.435	0.412	0.394	0.483	0.441	0.412	0.391	0.374
5th Year						0.539	0.493	0.461	0.438	0.420	0.509	0.467	0.438	0.417	0.400
6th Year											0.532	0.490	0.461	0.439	0.423
Avg p.a.e.	0.487	0.435	0.400	0.374	0.353	0.465	0.418	0.387	0.363	0.345	0.451	0.408	0.380	0.358	0.342
Rel p.a.e.	0.021	0.019	0.017	0.016	0.015	0.020	0.018	0.017	0.016	0.015	0.019	0.018	0.016	0.015	0.015

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.387	0.335	0.300	0.273	0.253	0.346	0.300	0.268	0.245	0.226	0.316	0.273	0.245	0.223	0.207
2nd Year	0.399	0.349	0.315	0.290	0.271	0.359	0.315	0.285	0.263	0.246	0.330	0.290	0.263	0.243	0.228
3rd Year	0.410	0.362	0.329	0.306	0.288	0.372	0.329	0.301	0.280	0.264	0.344	0.306	0.280	0.262	0.248
4th Year	0.421	0.374	0.343	0.321	0.304	0.384	0.343	0.316	0.296	0.282	0.357	0.321	0.296	0.279	0.266
5th Year						0.396	0.357	0.330	0.312	0.298	0.370	0.335	0.312	0.295	0.283
6th Year											0.383	0.349	0.326	0.311	0.299
Avg p.a.e.	0.404	0.355	0.322	0.297	0.279	0.371	0.329	0.300	0.279	0.263	0.350	0.312	0.287	0.269	0.255
Rel p.a.e.	0.017	0.015	0.014	0.013	0.012	0.016	0.014	0.013	0.012	0.011	0.015	0.013	0.012	0.012	0.011

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Projected Absolute Errors (State)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)
(Pooled Mean = 0.984, Estim Std Dev = 0.125, Avg D = 0.002)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.004	0.004
2nd Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.006	0.006
3rd Year	0.012	0.011	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.009	0.010	0.009	0.009	0.008	0.008
4th Year	0.014	0.013	0.012	0.012	0.011	0.013	0.012	0.011	0.011	0.011	0.012	0.012	0.011	0.011	0.010
5th Year						0.015	0.014	0.013	0.013	0.013	0.014	0.014	0.013	0.013	0.012
6th Year											0.016	0.016	0.015	0.015	0.014
Avg p.a.e.	0.011	0.010	0.009	0.008	0.008	0.011	0.010	0.009	0.009	0.009	0.011	0.010	0.010	0.010	0.009
Rel p.a.e.	0.011	0.010	0.009	0.009	0.008	0.011	0.010	0.010	0.009	0.009	0.012	0.011	0.010	0.010	0.009

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.004	0.004
2nd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
3rd Year	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004
4th Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
5th Year						0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
6th Year											0.009	0.008	0.007	0.007	0.007
Avg p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
Rel p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.004	0.004

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Projected Absolute Errors (State)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)
(Pooled Mean = 0.984, Estim Std Dev = 0.125, Avg D = 0.002)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.004	0.004
2nd Year	0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.006
3rd Year	0.010	0.009	0.008	0.008	0.007	0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006
4th Year	0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.007	0.009	0.008	0.008	0.007	0.007
5th Year						0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.007
6th Year											0.010	0.009	0.008	0.008	0.008
Avg p.a.e.	0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
Rel p.a.e.	0.010	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.007	0.009	0.008	0.007	0.007	0.006

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.004	0.004
2nd Year	0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.004
3rd Year	0.008	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
4th Year	0.008	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005
5th Year						0.008	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.005	0.005
6th Year											0.007	0.007	0.006	0.006	0.005
Avg p.a.e.	0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
Rel p.a.e.	0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.006	0.005	0.005

Projected Absolute Errors (State)

Item #9 - Percentage of principals having master's degree. (public schools)
(Pooled Mean = 0.929, Estim Std Dev = 0.256, Avg D = 0.016)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.016	0.014	0.012	0.011	0.010	0.014	0.012	0.011	0.010	0.009	0.013	0.011	0.010	0.009	0.008
2nd Year	0.032	0.030	0.028	0.027	0.027	0.030	0.028	0.027	0.026	0.025	0.029	0.027	0.026	0.025	0.025
3rd Year	0.048	0.046	0.045	0.044	0.043	0.047	0.045	0.043	0.042	0.042	0.045	0.044	0.042	0.041	0.041
4th Year	0.064	0.062	0.061	0.060	0.059	0.063	0.061	0.060	0.059	0.058	0.061	0.060	0.059	0.058	0.057
5th Year						0.079	0.077	0.076	0.075	0.074	0.078	0.076	0.075	0.074	0.073
6th Year											0.094	0.092	0.091	0.090	0.089
Avg p.a.e.	0.040	0.038	0.037	0.035	0.035	0.047	0.045	0.043	0.042	0.042	0.053	0.052	0.050	0.050	0.049
Rel p.a.e.	0.043	0.041	0.039	0.038	0.037	0.050	0.048	0.047	0.046	0.045	0.057	0.056	0.054	0.053	0.053

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.016	0.014	0.012	0.011	0.010	0.014	0.012	0.011	0.010	0.009	0.013	0.011	0.010	0.009	0.008
2nd Year	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
3rd Year	0.024	0.023	0.022	0.022	0.021	0.023	0.022	0.022	0.021	0.021	0.023	0.022	0.021	0.021	0.020
4th Year	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
5th Year						0.030	0.029	0.028	0.028	0.028	0.029	0.028	0.028	0.028	0.027
6th Year											0.040	0.039	0.038	0.037	0.037
Avg p.a.e.	0.020	0.019	0.019	0.018	0.018	0.021	0.021	0.020	0.020	0.020	0.024	0.023	0.023	0.023	0.022
Rel p.a.e.	0.022	0.021	0.020	0.020	0.019	0.023	0.022	0.022	0.021	0.021	0.026	0.025	0.025	0.024	0.024

Projected Absolute Errors (State)

Item #9 - Percentage of principals having master's degree. (public schools)
(Pooled Mean = 0.929, Estim Std Dev = 0.256, Avg D = 0.016)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.016	0.014	0.012	0.011	0.010	0.014	0.012	0.011	0.010	0.009	0.013	0.011	0.010	0.009	0.008
2nd Year	0.029	0.027	0.025	0.024	0.023	0.027	0.025	0.024	0.023	0.022	0.026	0.024	0.023	0.022	0.021
3rd Year	0.034	0.032	0.031	0.029	0.029	0.032	0.031	0.029	0.028	0.028	0.031	0.029	0.028	0.027	0.027
4th Year	0.038	0.036	0.035	0.034	0.033	0.037	0.035	0.033	0.032	0.032	0.035	0.034	0.032	0.032	0.031
5th Year						0.040	0.038	0.037	0.036	0.035	0.039	0.037	0.036	0.035	0.034
6th Year											0.042	0.040	0.039	0.038	0.037
Avg p.a.e.	0.029	0.027	0.026	0.025	0.024	0.030	0.028	0.027	0.026	0.025	0.031	0.029	0.028	0.027	0.027
Rel p.a.e.	0.031	0.029	0.028	0.026	0.026	0.032	0.030	0.029	0.028	0.027	0.033	0.032	0.030	0.029	0.029

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	168	224	280	336	392	210	280	350	420	490	252	336	420	504	588
1st Year	0.016	0.014	0.012	0.011	0.010	0.014	0.012	0.011	0.010	0.009	0.013	0.011	0.010	0.009	0.008
2nd Year	0.020	0.019	0.018	0.017	0.017	0.019	0.018	0.017	0.016	0.016	0.018	0.017	0.016	0.016	0.015
3rd Year	0.024	0.023	0.022	0.021	0.021	0.023	0.022	0.021	0.021	0.021	0.022	0.021	0.021	0.020	0.020
4th Year	0.027	0.026	0.026	0.025	0.025	0.027	0.026	0.025	0.025	0.024	0.026	0.025	0.025	0.024	0.024
5th Year						0.030	0.029	0.028	0.028	0.028	0.029	0.028	0.028	0.027	0.027
6th Year											0.032	0.031	0.031	0.030	0.030
Avg p.a.e.	0.022	0.020	0.019	0.019	0.018	0.022	0.021	0.020	0.020	0.019	0.023	0.022	0.022	0.021	0.021
Rel p.a.e.	0.024	0.022	0.021	0.020	0.020	0.024	0.023	0.022	0.021	0.021	0.025	0.024	0.023	0.023	0.023

Projected Absolute Errors (State)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)
(Pooled Mean = 0.404, Estim Std Dev = 0.491, Avg D = 0.001)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
2nd Year	0.014	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.009	0.011	0.010	0.009	0.008	0.008
3rd Year	0.015	0.013	0.012	0.011	0.011	0.014	0.012	0.011	0.010	0.010	0.013	0.011	0.010	0.010	0.009
4th Year	0.016	0.015	0.013	0.013	0.012	0.015	0.013	0.012	0.012	0.011	0.014	0.013	0.012	0.011	0.010
5th Year						0.016	0.015	0.014	0.013	0.012	0.015	0.014	0.013	0.012	0.012
6th Year											0.016	0.015	0.014	0.014	0.013
Avg p.a.e.	0.014	0.013	0.011	0.011	0.010	0.014	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.010	0.010
Rel p.a.e.	0.035	0.031	0.028	0.026	0.025	0.034	0.030	0.028	0.026	0.024	0.033	0.030	0.027	0.026	0.024

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.007	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.004
6th Year											0.010	0.009	0.008	0.008	0.007
Avg p.a.e.	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.006	0.005	0.005	0.005	0.004
Rel p.a.e.	0.014	0.013	0.012	0.011	0.010	0.013	0.012	0.011	0.010	0.010	0.015	0.013	0.012	0.011	0.011

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Projected Absolute Errors (State)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)
(Pooled Mean = 0.404, Estim Std Dev = 0.491, Avg D = 0.001)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
2nd Year	0.013	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.008
3rd Year	0.014	0.012	0.011	0.010	0.010	0.013	0.011	0.010	0.009	0.009	0.012	0.010	0.009	0.009	0.008
4th Year	0.014	0.012	0.011	0.011	0.010	0.013	0.011	0.010	0.010	0.009	0.012	0.011	0.010	0.009	0.008
5th Year						0.013	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.009
6th Year											0.012	0.011	0.010	0.009	0.009
Avg p.a.e.	0.013	0.012	0.011	0.010	0.009	0.012	0.011	0.010	0.009	0.008	0.012	0.010	0.009	0.009	0.008
Rel p.a.e.	0.033	0.029	0.026	0.024	0.023	0.031	0.027	0.024	0.022	0.021	0.029	0.025	0.023	0.021	0.020

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
2nd Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
3rd Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
4th Year	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
5th Year						0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.008	0.007	0.007
6th Year											0.010	0.009	0.008	0.007	0.007
Avg p.a.e.	0.012	0.011	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.007	0.010	0.009	0.008	0.007	0.007
Rel p.a.e.	0.031	0.027	0.024	0.022	0.020	0.028	0.024	0.022	0.020	0.018	0.025	0.022	0.020	0.018	0.017

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Projected Absolute Errors (State)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)
(Pooled Mean = 0.043, Estim Std Dev = 0.203, Avg D = 0.001)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
2nd Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
3rd Year	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.004
4th Year	0.008	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005
5th Year						0.008	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006
6th Year											0.008	0.008	0.007	0.007	0.007
Avg p.a.e.	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005
Rel p.a.e.	0.147	0.131	0.120	0.112	0.106	0.144	0.129	0.120	0.112	0.107	0.144	0.131	0.122	0.115	0.110

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2.520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.002	0.002
4th Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
5th Year						0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.002	0.002
6th Year											0.005	0.004	0.004	0.004	0.004
Avg p.a.e.	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002
Rel p.a.e.	0.061	0.055	0.051	0.048	0.046	0.059	0.053	0.050	0.047	0.045	0.064	0.058	0.054	0.051	0.049

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Projected Absolute Errors (State)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)
(Pooled Mean = 0.043, Estim Std Dev = 0.203, Avg D = 0.001)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
2nd Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003
3rd Year	0.006	0.005	0.005	0.005	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
4th Year	0.006	0.006	0.005	0.005	0.004	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004
5th Year						0.006	0.005	0.005	0.005	0.004	0.005	0.005	0.005	0.004	0.004
6th Year											0.006	0.005	0.005	0.004	0.004
Avg p.a.e.	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
Rel p.a.e.	0.134	0.118	0.108	0.099	0.093	0.125	0.110	0.101	0.094	0.088	0.118	0.105	0.096	0.089	0.084

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,008	1,344	1,680	2,016	2,352	1,260	1,680	2,100	2,520	2,940	1,512	2,016	2,520	3,024	3,528
1st Year	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
2nd Year	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
3rd Year	0.005	0.005	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
4th Year	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
5th Year						0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
6th Year											0.004	0.004	0.004	0.003	0.003
Avg p.a.e.	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
Rel p.a.e.	0.120	0.104	0.094	0.086	0.080	0.108	0.094	0.085	0.078	0.073	0.100	0.087	0.079	0.072	0.068

SASS Results, Estimates, and Projected Absolute Errors (Iowa) Public Schools
Large-Sample Scenarios with Periodicities of 4, 5, or 6 Years
under Models 1, 2A, 3A, 4M

[SASS Results] [Estimates]

Item	Source	1987 - 88				1990 - 91				1993 - 94				Pooled	Estim	
		N*	N	Mean	Std Dev	N*	N	Mean	Std Dev	N*	N	Mean	Std Dev	Mean	Std Dev	Avg D
#1	School (Pub)	152	92	41.292	32.312	177	99	39.337	32.632	158	85	43.091	29.685	41.240	31.571	0.951
#4	School (Pub)	152	152	1.832	2.021	177	177	2.062	2.156					1.947	2.090	0.077
#6	Adminr (Pub & Pri)	189	189	0.008	0.087	208	208	0.026	0.159	189	189	0.016	0.126	0.017	0.127	0.005
#7A	School (Pub)	152	152	15.107	3.593	177	177	14.334	3.662	158	156	14.689	3.325	14.710	3.530	0.188
#7B	School (Pri)	40	40	13.300	6.729	32	32	13.824	3.971	27	27	15.002	3.280	14.042	4.893	0.284
#8A	School (Pub)	152	152	1.000	0.000	177	177	0.984	0.124	158	158	0.996	0.060	0.994	0.080	0.005
#8B	School (Pri)	40	40	0.882	0.323	32	32	0.818	0.387	27	27	1.000	0.000	0.900	0.291	0.041
#9	Adminr (Pub)	151	151	0.993	0.081	177	177	0.990	0.099	163	163	0.981	0.136	0.988	0.108	0.002
#10A	Teacher (Pub)	N/A	N/A	N/A	N/A	941	941	0.479	0.500	906	906	0.420	0.494	0.449	0.497	0.020
#10B	Teacher (Pri)	N/A	N/A	N/A	N/A	80	80	0.278	0.448	89	89	0.385	0.487	0.332	0.468	0.036
#11A	Teacher (Pub)	N/A	N/A	N/A	N/A	941	941	0.021	0.144	906	906	0.025	0.155	0.023	0.150	0.001
#11B	Teacher (Pri)	N/A	N/A	N/A	N/A	80	80	0.083	0.276	89	89	0.053	0.225	0.068	0.252	0.010

* denotes actual sample size.

[Projected Absolute Errors]

Item	Source	Ref N	Rel p.a.e. Mod 1 p=0.5 -- Periodicity --			Rel p.a.e. Mod 2A p=0.5 -- Periodicity --			Rel p.a.e. Mod 3A p=0.5 -- Periodicity --			Rel p.a.e. Mod 4M p=0.5 -- Periodicity --		
			4 yrs	5 yrs	6 yrs	4 yrs	5 yrs	6 yrs	4 yrs	5 yrs	6 yrs	4 yrs	5 yrs	6 yrs
#1	School (Pub)	160	0.089	0.095	0.102	0.040	0.041	0.046	0.073	0.071	0.070	0.059	0.055	0.053
#4	School (Pub)	160	0.135	0.147	0.161	0.063	0.065	0.072	0.109	0.107	0.106	0.085	0.081	0.079
#6	Adminr (Pub & Pri)	200	0.908	0.997	1.100	0.428	0.444	0.496	0.720	0.712	0.711	0.557	0.535	0.527
#7A	School (Pub)	160	0.036	0.041	0.046	0.018	0.018	0.021	0.028	0.028	0.028	0.021	0.021	0.021
#7B	School (Pri)													
#8A	School (Pub)	160	0.013	0.014	0.016	0.006	0.007	0.007	0.010	0.010	0.010	0.007	0.007	0.007
#8B	School (Pri)													
#9	Adminr (Pub)	160	0.011	0.011	0.012	0.005	0.005	0.005	0.009	0.009	0.009	0.008	0.007	0.007
#10A	Teacher (Pub)	900	0.098	0.117	0.136	0.050	0.055	0.062	0.069	0.072	0.076	0.052	0.055	0.058
#10B	Teacher (Pri)													
#11A	Teacher (Pub)	900	0.269	0.273	0.283	0.116	0.115	0.126	0.235	0.223	0.214	0.200	0.182	0.170
#11B	Teacher (Pri)													
Avg			0.078	0.086	0.094	0.037	0.038	0.042	0.062	0.062	0.062	0.049	0.047	0.047

Projected Absolute Errors (State)

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 1] **(Pooled Mean = 41.240, Estim Std Dev = 31.571, Avg D = 0.951)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	2.882	2.496	2.232	2.038	1.887	2.578	2.232	1.997	1.823	1.688	2.353	2.038	1.823	1.664	1.541
2nd Year	3.833	3.447	3.184	2.989	2.838	3.529	3.184	2.948	2.774	2.639	3.305	2.989	2.774	2.615	2.492
3rd Year	4.785	4.399	4.135	3.941	3.790	4.481	4.135	3.900	3.726	3.590	4.256	3.941	3.726	3.567	3.443
4th Year	5.736	5.350	5.087	4.892	4.741	5.432	5.087	4.851	4.677	4.542	5.208	4.892	4.677	4.518	4.395
5th Year						6.384	6.038	5.803	5.629	5.493	6.159	5.844	5.629	5.470	5.346
6th Year											7.110	6.795	6.580	6.421	6.298
Avg p.a.e.	4.309	3.923	3.660	3.465	3.314	4.481	4.135	3.900	3.726	3.590	4.732	4.417	4.201	4.043	3.919
Rel avg	0.104	0.095	0.089	0.084	0.080	0.109	0.100	0.095	0.090	0.087	0.115	0.107	0.102	0.098	0.095

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	2.882	2.496	2.232	2.038	1.887	2.578	2.232	1.997	1.823	1.688	2.353	2.038	1.823	1.664	1.541
2nd Year	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
3rd Year	2.392	2.199	2.068	1.970	1.895	2.240	2.068	1.950	1.863	1.795	2.128	1.970	1.863	1.783	1.722
4th Year	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427
5th Year						2.394	2.264	2.176	2.111	2.060	2.310	2.191	2.111	2.051	2.005
6th Year											3.549	3.312	3.151	3.032	2.939
Avg p.a.e.	1.913	1.768	1.670	1.597	1.540	1.918	1.789	1.700	1.635	1.584	2.120	1.982	1.888	1.818	1.764
Rel avg	0.046	0.043	0.040	0.039	0.037	0.047	0.043	0.041	0.040	0.038	0.051	0.048	0.046	0.044	0.043

Projected Absolute Errors (State)

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 3A] (Pooled Mean = 41.240, Estim Std Dev = 31.571, Avg D = 0.951)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	2.882	2.496	2.232	2.038	1.887	2.578	2.232	1.997	1.823	1.688	2.353	2.038	1.823	1.664	1.541
2nd Year	3.643	3.257	2.994	2.799	2.648	3.339	2.994	2.758	2.584	2.449	3.114	2.799	2.584	2.425	2.302
3rd Year	3.958	3.572	3.309	3.114	2.963	3.654	3.309	3.073	2.899	2.764	3.430	3.114	2.899	2.740	2.617
4th Year	4.200	3.814	3.551	3.356	3.205	3.896	3.551	3.315	3.141	3.006	3.672	3.356	3.141	2.982	2.859
5th Year						4.100	3.755	3.519	3.345	3.210	3.876	3.560	3.345	3.186	3.063
6th Year											4.055	3.740	3.525	3.366	3.243
Avg p.a.e.	3.671	3.285	3.021	2.827	2.676	3.513	3.168	2.932	2.758	2.623	3.417	3.101	2.886	2.727	2.604
Rel avg	0.089	0.080	0.073	0.069	0.065	0.085	0.077	0.071	0.067	0.064	0.083	0.075	0.070	0.066	0.063

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	2.882	2.496	2.232	2.038	1.887	2.578	2.232	1.997	1.823	1.688	2.353	2.038	1.823	1.664	1.541
2nd Year	2.981	2.609	2.359	2.175	2.034	2.688	2.359	2.137	1.975	1.851	2.473	2.175	1.975	1.830	1.718
3rd Year	3.076	2.718	2.478	2.305	2.172	2.793	2.478	2.268	2.117	2.002	2.588	2.305	2.117	1.982	1.879
4th Year	3.169	2.823	2.593	2.427	2.302	2.895	2.593	2.393	2.250	2.141	2.697	2.427	2.250	2.123	2.028
5th Year						2.994	2.702	2.511	2.375	2.273	2.803	2.544	2.375	2.255	2.166
6th Year											2.904	2.655	2.494	2.380	2.296
Avg p.a.e.	3.027	2.662	2.416	2.236	2.099	2.790	2.473	2.261	2.108	1.991	2.636	2.357	2.172	2.039	1.938
Rel avg	0.073	0.065	0.059	0.054	0.051	0.068	0.060	0.055	0.051	0.048	0.064	0.057	0.053	0.049	0.047

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Projected Absolute Errors (State)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 1] **(Pooled Mean = 1.947, Estim Std Dev = 2.090, Avg D = 0.077)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.191	0.165	0.148	0.135	0.125	0.171	0.148	0.132	0.121	0.112	0.156	0.135	0.121	0.110	0.102
2nd Year	0.268	0.242	0.225	0.212	0.202	0.247	0.225	0.209	0.197	0.189	0.233	0.212	0.197	0.187	0.179
3rd Year	0.344	0.319	0.301	0.289	0.279	0.324	0.301	0.286	0.274	0.265	0.309	0.289	0.274	0.264	0.256
4th Year	0.421	0.396	0.378	0.365	0.355	0.401	0.378	0.363	0.351	0.342	0.386	0.365	0.351	0.341	0.332
5th Year						0.478	0.455	0.439	0.428	0.419	0.463	0.442	0.428	0.417	0.409
6th Year											0.540	0.519	0.505	0.494	0.486
Avg p.a.e.	0.306	0.280	0.263	0.250	0.240	0.324	0.301	0.286	0.274	0.265	0.348	0.327	0.313	0.302	0.294
Rel avg	0.157	0.144	0.135	0.128	0.123	0.167	0.155	0.147	0.141	0.136	0.179	0.168	0.161	0.155	0.151

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.191	0.165	0.148	0.135	0.125	0.171	0.148	0.132	0.121	0.112	0.156	0.135	0.121	0.110	0.102
2nd Year	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
3rd Year	0.172	0.159	0.151	0.144	0.139	0.162	0.151	0.143	0.137	0.133	0.155	0.144	0.137	0.132	0.128
4th Year	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115
5th Year						0.179	0.171	0.165	0.160	0.157	0.174	0.166	0.160	0.157	0.153
6th Year											0.261	0.245	0.235	0.227	0.221
Avg p.a.e.	0.139	0.129	0.123	0.118	0.114	0.141	0.132	0.126	0.122	0.119	0.156	0.147	0.141	0.136	0.133
Rel avg	0.071	0.066	0.063	0.061	0.059	0.072	0.068	0.065	0.063	0.061	0.080	0.076	0.072	0.070	0.068

Projected Absolute Errors (State)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] (Pooled Mean = 1.947, Estim Std Dev = 2.090, Avg D = 0.077)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.191	0.165	0.148	0.135	0.125	0.171	0.148	0.132	0.121	0.112	0.156	0.135	0.121	0.110	0.102
2nd Year	0.252	0.227	0.209	0.196	0.186	0.232	0.209	0.194	0.182	0.173	0.217	0.196	0.182	0.172	0.163
3rd Year	0.278	0.252	0.235	0.222	0.212	0.258	0.235	0.219	0.208	0.199	0.243	0.222	0.208	0.197	0.189
4th Year	0.297	0.272	0.254	0.241	0.231	0.277	0.254	0.239	0.227	0.218	0.262	0.241	0.227	0.217	0.208
5th Year						0.294	0.271	0.255	0.244	0.235	0.279	0.258	0.244	0.233	0.225
6th Year											0.293	0.272	0.258	0.248	0.239
Avg p.a.e.	0.254	0.229	0.211	0.199	0.189	0.246	0.223	0.208	0.196	0.187	0.242	0.221	0.207	0.196	0.188
Rel avg	0.131	0.118	0.109	0.102	0.097	0.126	0.115	0.107	0.101	0.096	0.124	0.113	0.106	0.101	0.096

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.191	0.165	0.148	0.135	0.125	0.171	0.148	0.132	0.121	0.112	0.156	0.135	0.121	0.110	0.102
2nd Year	0.200	0.176	0.160	0.148	0.139	0.181	0.160	0.146	0.135	0.127	0.167	0.148	0.135	0.126	0.119
3rd Year	0.210	0.187	0.171	0.160	0.152	0.191	0.171	0.158	0.149	0.142	0.178	0.160	0.149	0.140	0.134
4th Year	0.218	0.197	0.182	0.172	0.164	0.201	0.182	0.170	0.161	0.154	0.189	0.172	0.161	0.153	0.147
5th Year						0.210	0.192	0.180	0.172	0.166	0.198	0.182	0.172	0.165	0.160
6th Year											0.208	0.193	0.183	0.176	0.171
Avg p.a.e.	0.205	0.181	0.165	0.154	0.145	0.191	0.171	0.157	0.148	0.140	0.183	0.165	0.153	0.145	0.139
Rel avg	0.105	0.093	0.085	0.079	0.075	0.098	0.088	0.081	0.076	0.072	0.094	0.085	0.079	0.075	0.071

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Projected Absolute Errors (State)

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 1] **(Pooled Mean = 0.017, Estim Std Dev = 0.127, Avg D = 0.005)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	96	128	160	192	224	120	160	200	240	280	144	192	240	288	336
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
2nd Year	0.015	0.014	0.013	0.012	0.011	0.014	0.013	0.012	0.011	0.011	0.013	0.012	0.011	0.011	0.010
3rd Year	0.020	0.018	0.017	0.017	0.016	0.019	0.017	0.017	0.016	0.015	0.018	0.017	0.016	0.015	0.015
4th Year	0.024	0.023	0.022	0.021	0.021	0.023	0.022	0.021	0.021	0.020	0.022	0.021	0.021	0.020	0.020
5th Year						0.028	0.027	0.026	0.025	0.025	0.027	0.026	0.025	0.025	0.024
6th Year											0.032	0.031	0.030	0.029	0.029
Avg p.a.e.	0.017	0.016	0.015	0.014	0.014	0.019	0.017	0.017	0.016	0.015	0.020	0.019	0.018	0.018	0.017
Rel p.a.e.	1.050	0.966	0.908	0.866	0.833	1.124	1.049	0.997	0.959	0.930	1.216	1.147	1.100	1.065	1.038

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	96	128	160	192	224	120	160	200	240	280	144	192	240	288	336
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
2nd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
3rd Year	0.010	0.009	0.009	0.008	0.008	0.009	0.009	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.007
4th Year	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
5th Year						0.010	0.010	0.010	0.009	0.009	0.010	0.010	0.009	0.009	0.009
6th Year											0.015	0.014	0.014	0.013	0.013
Avg p.a.e.	0.008	0.007	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.009	0.009	0.008	0.008	0.008
Rel p.a.e.	0.482	0.450	0.428	0.412	0.400	0.492	0.464	0.444	0.430	0.419	0.546	0.516	0.496	0.481	0.469

Projected Absolute Errors (State)

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] (Pooled Mean = 0.017, Estim Std Dev = 0.127, Avg D = 0.005)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	96	128	160	192	224	120	160	200	240	280	144	192	240	288	336
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
2nd Year	0.014	0.013	0.012	0.011	0.011	0.013	0.012	0.011	0.010	0.010	0.012	0.011	0.010	0.010	0.009
3rd Year	0.016	0.014	0.013	0.013	0.012	0.015	0.013	0.012	0.012	0.011	0.014	0.013	0.012	0.011	0.011
4th Year	0.017	0.015	0.014	0.014	0.013	0.016	0.014	0.014	0.013	0.013	0.015	0.014	0.013	0.012	0.012
5th Year						0.017	0.015	0.015	0.014	0.014	0.016	0.015	0.014	0.013	0.013
6th Year											0.017	0.016	0.015	0.014	0.014
Avg p.a.e.	0.014	0.013	0.012	0.011	0.011	0.014	0.013	0.012	0.011	0.011	0.014	0.013	0.012	0.011	0.011
Rel p.a.e.	0.861	0.777	0.720	0.677	0.644	0.838	0.763	0.712	0.674	0.644	0.827	0.758	0.711	0.677	0.650

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	96	128	160	192	224	120	160	200	240	280	144	192	240	288	336
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
2nd Year	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.007	0.009	0.008	0.008	0.007	0.007
3rd Year	0.012	0.010	0.010	0.009	0.009	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.008
4th Year	0.012	0.011	0.010	0.010	0.009	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.009
5th Year						0.012	0.011	0.010	0.010	0.010	0.011	0.010	0.010	0.010	0.009
6th Year											0.012	0.011	0.011	0.010	0.010
Avg p.a.e.	0.011	0.010	0.009	0.009	0.008	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008
Rel p.a.e.	0.685	0.608	0.557	0.520	0.492	0.643	0.578	0.535	0.504	0.480	0.620	0.564	0.527	0.500	0.480

Projected Absolute Errors (State)

Item #7A - Number of students per FTE teacher. (public schools)

[Model 1] (Pooled Mean = 14.710, Estim Std Dev = 3.530, Avg D = 0.188)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.322	0.279	0.250	0.228	0.211	0.288	0.250	0.223	0.204	0.189	0.263	0.228	0.204	0.186	0.172
2nd Year	0.510	0.467	0.438	0.416	0.399	0.476	0.438	0.411	0.392	0.377	0.451	0.416	0.392	0.374	0.360
3rd Year	0.698	0.655	0.626	0.604	0.587	0.664	0.626	0.599	0.580	0.565	0.639	0.604	0.580	0.562	0.548
4th Year	0.886	0.843	0.814	0.792	0.775	0.852	0.814	0.787	0.768	0.753	0.827	0.792	0.768	0.750	0.736
5th Year						1.040	1.002	0.975	0.956	0.941	1.015	0.980	0.956	0.938	0.924
6th Year											1.203	1.168	1.144	1.126	1.113
Avg p.a.e.	0.604	0.561	0.532	0.510	0.493	0.664	0.626	0.599	0.580	0.565	0.733	0.698	0.674	0.656	0.642
Rel p.a.e.	0.041	0.038	0.036	0.035	0.034	0.045	0.043	0.041	0.039	0.038	0.050	0.047	0.046	0.045	0.044

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.322	0.279	0.250	0.228	0.211	0.288	0.250	0.223	0.204	0.189	0.263	0.228	0.204	0.186	0.172
2nd Year	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188
3rd Year	0.349	0.328	0.313	0.302	0.294	0.332	0.313	0.300	0.290	0.282	0.320	0.302	0.290	0.281	0.274
4th Year	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
5th Year						0.390	0.376	0.366	0.359	0.353	0.381	0.368	0.359	0.352	0.347
6th Year											0.550	0.523	0.505	0.492	0.482
Avg p.a.e.	0.285	0.269	0.258	0.250	0.244	0.296	0.282	0.272	0.264	0.259	0.331	0.315	0.305	0.297	0.291
Rel p.a.e.	0.019	0.018	0.018	0.017	0.017	0.020	0.019	0.018	0.018	0.018	0.022	0.021	0.021	0.020	0.020

Projected Absolute Errors (State)

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 14.710, Estim Std Dev = 3.530, Avg D = 0.188)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.322	0.279	0.250	0.228	0.211	0.288	0.250	0.223	0.204	0.189	0.263	0.228	0.204	0.186	0.172
2nd Year	0.473	0.429	0.400	0.378	0.361	0.439	0.400	0.374	0.354	0.339	0.414	0.378	0.354	0.336	0.323
3rd Year	0.535	0.492	0.462	0.441	0.424	0.501	0.462	0.436	0.417	0.401	0.476	0.441	0.417	0.399	0.385
4th Year	0.583	0.540	0.510	0.488	0.472	0.549	0.510	0.484	0.464	0.449	0.524	0.488	0.464	0.447	0.433
5th Year						0.589	0.550	0.524	0.505	0.490	0.564	0.529	0.505	0.487	0.473
6th Year											0.599	0.564	0.540	0.522	0.509
Avg p.a.e.	0.478	0.435	0.406	0.384	0.367	0.473	0.435	0.408	0.389	0.374	0.473	0.438	0.414	0.396	0.382
Rel p.a.e.	0.033	0.030	0.028	0.026	0.025	0.032	0.030	0.028	0.026	0.025	0.032	0.030	0.028	0.027	0.026

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.322	0.279	0.250	0.228	0.211	0.288	0.250	0.223	0.204	0.189	0.263	0.228	0.204	0.186	0.172
2nd Year	0.356	0.317	0.291	0.273	0.259	0.325	0.291	0.269	0.253	0.241	0.303	0.273	0.253	0.239	0.229
3rd Year	0.386	0.351	0.328	0.312	0.300	0.358	0.328	0.308	0.295	0.284	0.338	0.312	0.295	0.283	0.274
4th Year	0.414	0.382	0.361	0.346	0.335	0.389	0.361	0.343	0.331	0.322	0.370	0.346	0.331	0.320	0.312
5th Year						0.417	0.391	0.375	0.363	0.355	0.400	0.377	0.363	0.354	0.347
6th Year											0.427	0.406	0.393	0.384	0.378
Avg p.a.e.	0.370	0.332	0.307	0.290	0.276	0.355	0.324	0.304	0.289	0.278	0.350	0.324	0.307	0.294	0.285
Rel p.a.e.	0.025	0.023	0.021	0.020	0.019	0.024	0.022	0.021	0.020	0.019	0.024	0.022	0.021	0.020	0.019

Projected Absolute Errors (State)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)

[Model 1] **(Pooled Mean = 0.994, Estim Std Dev = 0.080, Avg D = 0.005)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.004	0.006	0.005	0.005	0.004	0.004
2nd Year	0.012	0.011	0.010	0.010	0.009	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.009
3rd Year	0.017	0.016	0.015	0.014	0.014	0.016	0.015	0.014	0.014	0.014	0.015	0.014	0.014	0.013	0.013
4th Year	0.021	0.020	0.020	0.019	0.019	0.020	0.020	0.019	0.018	0.018	0.020	0.019	0.018	0.018	0.018
5th Year						0.025	0.024	0.024	0.023	0.023	0.024	0.024	0.023	0.023	0.022
6th Year											0.029	0.028	0.028	0.027	0.027
Avg p.a.e.	0.014	0.013	0.013	0.012	0.012	0.016	0.015	0.014	0.014	0.014	0.018	0.017	0.016	0.016	0.015
Rel p.a.e.	0.014	0.013	0.013	0.012	0.012	0.016	0.015	0.014	0.014	0.014	0.018	0.017	0.016	0.016	0.016

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.004	0.006	0.005	0.005	0.004	0.004
2nd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
3rd Year	0.008	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
4th Year	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
5th Year						0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.008
6th Year											0.013	0.013	0.012	0.012	0.012
Avg p.a.e.	0.007	0.006	0.006	0.006	0.006	0.007	0.007	0.007	0.006	0.006	0.008	0.008	0.007	0.007	0.007
Rel p.a.e.	0.007	0.006	0.006	0.006	0.006	0.007	0.007	0.007	0.006	0.006	0.008	0.008	0.007	0.007	0.007

Projected Absolute Errors (State)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)

[Model 3A] **(Pooled Mean = 0.994, Estim Std Dev = 0.080, Avg D = 0.005)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.004	0.006	0.005	0.005	0.004	0.004
2nd Year	0.011	0.010	0.009	0.009	0.008	0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.008
3rd Year	0.013	0.012	0.011	0.010	0.010	0.012	0.011	0.010	0.010	0.009	0.011	0.010	0.010	0.009	0.009
4th Year	0.014	0.013	0.012	0.012	0.011	0.013	0.012	0.011	0.011	0.011	0.012	0.012	0.011	0.011	0.010
5th Year						0.014	0.013	0.012	0.012	0.012	0.013	0.013	0.012	0.012	0.011
6th Year											0.014	0.013	0.013	0.012	0.012
Avg p.a.e.	0.011	0.010	0.009	0.009	0.009	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.010	0.009	0.009
Rel p.a.e.	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.010	0.009	0.009

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.004	0.006	0.005	0.005	0.004	0.004
2nd Year	0.008	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.005
3rd Year	0.009	0.008	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
4th Year	0.010	0.009	0.009	0.008	0.008	0.009	0.009	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.007
5th Year						0.010	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.008
6th Year											0.010	0.010	0.009	0.009	0.009
Avg p.a.e.	0.009	0.008	0.007	0.007	0.006	0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007
Rel p.a.e.	0.009	0.008	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007

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Projected Absolute Errors (State)

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 1] (Pooled Mean = 0.988, Estim Std Dev = 0.108, Avg D = 0.002)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.010	0.009	0.008	0.007	0.006	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005
2nd Year	0.012	0.011	0.010	0.009	0.009	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.007
3rd Year	0.014	0.013	0.012	0.011	0.011	0.013	0.012	0.011	0.010	0.010	0.012	0.011	0.010	0.010	0.009
4th Year	0.016	0.015	0.014	0.013	0.013	0.015	0.014	0.013	0.012	0.012	0.014	0.013	0.012	0.012	0.011
5th Year						0.017	0.016	0.015	0.014	0.014	0.016	0.015	0.014	0.014	0.014
6th Year											0.018	0.017	0.017	0.016	0.016
Avg p.a.e.	0.013	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.011	0.010
Rel p.a.e.	0.013	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.010	0.010	0.013	0.012	0.012	0.011	0.011

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.010	0.009	0.008	0.007	0.006	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005
2nd Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
3rd Year	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005
4th Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
5th Year						0.006	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005
6th Year											0.010	0.009	0.009	0.008	0.008
Avg p.a.e.	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.006	0.005	0.005	0.005	0.005
Rel p.a.e.	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.006	0.005	0.005	0.005	0.005

Projected Absolute Errors (State)

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.988, Estim Std Dev = 0.108, Avg D = 0.002)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.010	0.009	0.008	0.007	0.006	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005
2nd Year	0.012	0.010	0.009	0.009	0.008	0.010	0.009	0.008	0.008	0.007	0.010	0.009	0.008	0.007	0.007
3rd Year	0.012	0.011	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.008	0.010	0.009	0.009	0.008	0.008
4th Year	0.013	0.011	0.010	0.010	0.009	0.012	0.010	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.008
5th Year						0.012	0.011	0.010	0.010	0.009	0.011	0.010	0.010	0.009	0.009
6th Year											0.012	0.011	0.010	0.009	0.009
Avg p.a.e.	0.012	0.010	0.009	0.009	0.008	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008
Rel p.a.e.	0.012	0.010	0.009	0.009	0.008	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	77	102	128	154	179	96	128	160	192	224	115	154	192	230	269
1st Year	0.010	0.009	0.008	0.007	0.006	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005
2nd Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.006
3rd Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
4th Year	0.010	0.009	0.008	0.008	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.006	0.006
5th Year						0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006
6th Year											0.009	0.008	0.007	0.007	0.006
Avg p.a.e.	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
Rel p.a.e.	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.006	0.006

Projected Absolute Errors (State)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 1] **(Pooled Mean = 0.449, Estim Std Dev = 0.497, Avg D = 0.020)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.019	0.017	0.015	0.014	0.013	0.017	0.015	0.013	0.012	0.011	0.016	0.014	0.012	0.011	0.010
2nd Year	0.039	0.036	0.034	0.033	0.032	0.037	0.034	0.033	0.032	0.031	0.035	0.033	0.032	0.031	0.030
3rd Year	0.058	0.056	0.054	0.053	0.052	0.056	0.054	0.052	0.051	0.050	0.055	0.053	0.051	0.050	0.049
4th Year	0.078	0.075	0.074	0.072	0.071	0.076	0.074	0.072	0.071	0.070	0.074	0.072	0.071	0.070	0.069
5th Year						0.095	0.093	0.092	0.090	0.089	0.094	0.092	0.090	0.089	0.089
6th Year											0.113	0.111	0.110	0.109	0.108
Avg p.a.e.	0.048	0.046	0.044	0.043	0.042	0.056	0.054	0.052	0.051	0.050	0.065	0.062	0.061	0.060	0.059
Rel p.a.e.	0.108	0.102	0.098	0.095	0.093	0.125	0.120	0.117	0.114	0.112	0.144	0.139	0.136	0.133	0.132

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.019	0.017	0.015	0.014	0.013	0.017	0.015	0.013	0.012	0.011	0.016	0.014	0.012	0.011	0.010
2nd Year	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
3rd Year	0.029	0.028	0.027	0.026	0.026	0.028	0.027	0.026	0.026	0.025	0.027	0.026	0.026	0.025	0.025
4th Year	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
5th Year						0.036	0.035	0.034	0.034	0.034	0.035	0.034	0.034	0.033	0.033
6th Year											0.048	0.047	0.046	0.045	0.044
Avg p.a.e.	0.024	0.023	0.023	0.022	0.022	0.026	0.025	0.025	0.024	0.024	0.029	0.028	0.028	0.027	0.027
Rel p.a.e.	0.054	0.052	0.050	0.049	0.049	0.058	0.056	0.055	0.054	0.053	0.065	0.063	0.062	0.061	0.060

Projected Absolute Errors (State)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] (Pooled Mean = 0.449, Estim Std Dev = 0.497, Avg D = 0.020)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.019	0.017	0.015	0.014	0.013	0.017	0.015	0.013	0.012	0.011	0.016	0.014	0.012	0.011	0.010
2nd Year	0.035	0.032	0.030	0.029	0.028	0.033	0.030	0.029	0.028	0.027	0.031	0.029	0.028	0.027	0.026
3rd Year	0.041	0.039	0.037	0.036	0.035	0.039	0.037	0.035	0.034	0.033	0.038	0.036	0.034	0.033	0.032
4th Year	0.046	0.044	0.042	0.041	0.040	0.044	0.042	0.040	0.039	0.038	0.043	0.041	0.039	0.038	0.037
5th Year						0.048	0.046	0.045	0.043	0.043	0.047	0.045	0.043	0.042	0.042
6th Year											0.051	0.049	0.047	0.046	0.045
Avg p.a.e.	0.035	0.033	0.031	0.030	0.029	0.036	0.034	0.032	0.031	0.030	0.037	0.035	0.034	0.033	0.032
Rel p.a.e.	0.079	0.073	0.069	0.066	0.064	0.081	0.076	0.072	0.070	0.068	0.083	0.079	0.076	0.073	0.071

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.019	0.017	0.015	0.014	0.013	0.017	0.015	0.013	0.012	0.011	0.016	0.014	0.012	0.011	0.010
2nd Year	0.025	0.023	0.022	0.021	0.020	0.023	0.022	0.021	0.020	0.019	0.022	0.021	0.020	0.019	0.019
3rd Year	0.029	0.028	0.027	0.026	0.025	0.028	0.027	0.026	0.025	0.025	0.027	0.026	0.025	0.025	0.024
4th Year	0.033	0.032	0.031	0.030	0.030	0.032	0.031	0.030	0.030	0.029	0.031	0.030	0.030	0.029	0.029
5th Year						0.036	0.035	0.034	0.034	0.033	0.035	0.034	0.034	0.033	0.033
6th Year											0.038	0.038	0.037	0.037	0.036
Avg p.a.e.	0.027	0.025	0.023	0.023	0.022	0.027	0.026	0.025	0.024	0.024	0.028	0.027	0.026	0.026	0.025
Rel p.a.e.	0.059	0.055	0.052	0.050	0.049	0.061	0.057	0.055	0.054	0.052	0.063	0.060	0.058	0.057	0.056

Projected Absolute Errors (State)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)

[Model 1] (Pooled Mean = 0.023, Estim Std Dev = 0.150, Avg D = 0.001)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.004	0.004
3rd Year	0.008	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.005
4th Year	0.009	0.008	0.008	0.008	0.007	0.009	0.008	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007
5th Year						0.010	0.009	0.009	0.008	0.008	0.009	0.009	0.008	0.008	0.008
6th Year											0.010	0.010	0.009	0.009	0.009
Avg p.a.e.	0.007	0.007	0.006	0.006	0.005	0.007	0.007	0.006	0.006	0.006	0.008	0.007	0.007	0.006	0.006
Rel p.a.e.	0.325	0.292	0.269	0.252	0.239	0.324	0.294	0.273	0.258	0.246	0.329	0.302	0.283	0.269	0.258

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
6th Year											0.006	0.005	0.005	0.005	0.004
Avg p.a.e.	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.003
Rel p.a.e.	0.138	0.125	0.116	0.110	0.105	0.134	0.123	0.115	0.109	0.105	0.147	0.135	0.126	0.120	0.116

Projected Absolute Errors (State)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)

[Model 3A] (Pooled Mean = 0.023, Estim Std Dev = 0.150, Avg D = 0.001)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.007	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.004	0.006	0.005	0.005	0.004	0.004
3rd Year	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.004
4th Year	0.007	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005
5th Year						0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
6th Year											0.007	0.006	0.006	0.005	0.005
Avg p.a.e.	0.007	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.004
Rel p.a.e.	0.292	0.258	0.235	0.219	0.205	0.273	0.243	0.223	0.207	0.196	0.260	0.233	0.214	0.200	0.190

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	432	576	720	864	1,008	540	720	900	1,080	1,260	648	864	1,080	1,296	1,512
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.003	0.003
3rd Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003
4th Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003
5th Year						0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
6th Year											0.005	0.005	0.004	0.004	0.004
Avg p.a.e.	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003
Rel p.a.e.	0.255	0.222	0.200	0.184	0.171	0.231	0.202	0.182	0.168	0.157	0.214	0.188	0.170	0.158	0.148

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SASS Results, Estimates, and Projected Absolute Errors (New York) Public Schools
Large-Sample Scenarios with Periodicities of 4, 5, or 6 Years
under Models 1, 2A, 3A, 4M

[SASS Results] [Estimates]

Item	Source	1987 - 88 N*	1987 - 88 N	1987 - 88 Mean	1987 - 88 Std Dev	1990 - 91 N*	1990 - 91 N	1990 - 91 Mean	1990 - 91 Std Dev	1993 - 94 N*	1993 - 94 N	1993 - 94 Mean	1993 - 94 Std Dev	Pooled Mean	Estim Std Dev	Avg D
#1	School (Pub)	400	268	109.738	145.476	243	193	120.575	151.853	269	190	175.756	239.496	135.356	184.012	11.003
#4	School (Pub)	400	400	4.231	6.166	243	243	3.556	3.930					3.893	5.170	0.225
#6	Adminr (Pub & Pri)	642	642	0.075	0.264	498	498	0.055	0.229	551	551	0.103	0.304	0.078	0.267	0.011
#7A	School (Pub)	400	400	15.183	4.393	243	235	14.436	4.230	269	249	15.028	3.219	14.882	3.981	0.223
#7B	School (Pri)	231	231	16.427	8.287	226	218	16.028	8.079	243	233	16.505	7.302	16.320	7.901	0.146
#8A	School (Pub)	400	400	0.992	0.091	243	243	1.000	0.000	269	269	1.000	0.000	0.997	0.052	0.001
#8B	School (Pri)	231	231	0.844	0.363	226	226	0.900	0.299	243	243	0.858	0.349	0.867	0.338	0.017
#9	Adminr (Pub)	415	415	0.964	0.185	248	248	0.976	0.152	280	280	0.991	0.093	0.977	0.148	0.004
#10A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,173	1,173	0.423	0.494	1,459	1,459	0.403	0.491	0.413	0.492	0.006
#10B	Teacher (Pri)	N/A	N/A	N/A	N/A	588	588	0.303	0.460	728	728	0.279	0.449	0.291	0.454	0.008
#11A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,173	1,173	0.013	0.111	1,459	1,459	0.030	0.171	0.021	0.144	0.006
#11B	Teacher (Pri)	N/A	N/A	N/A	N/A	588	588	0.037	0.189	728	728	0.064	0.245	0.051	0.219	0.009

* denotes actual sample size.

[Projected Absolute Errors]

Item	Source	Ref N	Rel p.a.e. Mod 1 p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 2A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 3A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 4M p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs
#1	School (Pub)	270	0.196	0.229	0.264	0.099	0.106	0.120	0.141	0.146	0.151	0.106	0.110	0.115
#4	School (Pub)	270	0.159	0.180	0.203	0.078	0.082	0.092	0.120	0.121	0.124	0.091	0.090	0.092
#6	Adminr (Pub & Pri)	550	0.347	0.405	0.466	0.175	0.188	0.212	0.250	0.259	0.268	0.188	0.194	0.203
#7A	School (Pub)	270	0.037	0.043	0.049	0.019	0.020	0.022	0.027	0.028	0.029	0.020	0.021	0.022
#7B	School (Pri)													
#8A	School (Pub)	270	0.005	0.005	0.006	0.002	0.002	0.003	0.004	0.004	0.004	0.003	0.003	0.003
#8B	School (Pri)													
#9	Adminr (Pub)	270	0.015	0.017	0.018	0.007	0.007	0.008	0.012	0.012	0.012	0.009	0.009	0.009
#10A	Teacher (Pub)	1,460	0.051	0.056	0.062	0.024	0.025	0.028	0.041	0.040	0.040	0.032	0.030	0.030
#10B	Teacher (Pri)													
#11A	Teacher (Pub)	1,460	0.572	0.693	0.819	0.301	0.329	0.373	0.387	0.413	0.437	0.298	0.323	0.349
#11B	Teacher (Pri)													
Avg			0.074	0.084	0.095	0.036	0.038	0.043	0.055	0.056	0.057	0.042	0.042	0.043

Projected Absolute Errors (State)

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 1] (Pooled Mean = 135.356, Estim Std Dev = 184.012, Avg D = 11.003)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	12.931	11.199	10.016	9.144	8.465	11.566	10.016	8.959	8.178	7.572	10.558	9.144	8.178	7.466	6.912
2nd Year	23.934	22.202	21.019	20.147	19.468	22.569	21.019	19.962	19.181	18.575	21.561	20.147	19.181	18.469	17.915
3rd Year	34.937	33.205	32.022	31.150	30.471	33.572	32.022	30.965	30.184	29.578	32.564	31.150	30.184	29.472	28.918
4th Year	45.940	44.208	43.025	42.153	41.474	44.575	43.025	41.968	41.187	40.581	43.567	42.153	41.187	40.475	39.921
5th Year						55.578	54.028	52.971	52.190	51.584	54.570	53.156	52.190	51.478	50.924
6th Year											65.573	64.159	63.193	62.481	61.927
Avg p.a.e.	29.436	27.703	26.521	25.648	24.970	33.572	32.022	30.965	30.184	29.578	38.066	36.651	35.686	34.973	34.419
Rel avg	0.217	0.205	0.196	0.189	0.184	0.248	0.237	0.229	0.223	0.219	0.281	0.271	0.264	0.258	0.254

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	12.931	11.199	10.016	9.144	8.465	11.566	10.016	8.959	8.178	7.572	10.558	9.144	8.178	7.466	6.912
2nd Year	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003	11.003
3rd Year	17.469	16.602	16.011	15.575	15.236	16.786	16.011	15.482	15.092	14.789	16.282	15.575	15.092	14.736	14.459
4th Year	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504	16.504
5th Year						20.842	20.261	19.864	19.571	19.344	20.464	19.933	19.571	19.304	19.096
6th Year											28.549	27.488	26.764	26.230	25.815
Avg p.a.e.	14.477	13.827	13.384	13.056	12.802	15.340	14.759	14.363	14.070	13.842	17.227	16.608	16.186	15.874	15.632
Rel avg	0.107	0.102	0.099	0.096	0.095	0.113	0.109	0.106	0.104	0.102	0.127	0.123	0.120	0.117	0.115

Projected Absolute Errors (State)

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 3A] (Pooled Mean = 135.356, Estim Std Dev = 184.012, Avg D = 11.003)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	12.931	11.199	10.016	9.144	8.465	11.566	10.016	8.959	8.178	7.572	10.558	9.144	8.178	7.466	6.912
2nd Year	21.733	20.001	18.819	17.946	17.268	20.368	18.819	17.761	16.981	16.374	19.361	17.946	16.981	16.268	15.714
3rd Year	25.379	23.647	22.465	21.592	20.914	24.014	22.465	21.407	20.627	20.020	23.007	21.592	20.627	19.914	19.360
4th Year	28.177	26.445	25.263	24.390	23.712	26.812	25.263	24.205	23.424	22.818	25.804	24.390	23.424	22.712	22.158
5th Year						29.171	27.621	26.564	25.783	25.176	28.163	26.748	25.783	25.071	24.517
6th Year											30.241	28.826	27.861	27.148	26.595
Avg p.a.e.	22.055	20.323	19.141	18.268	17.590	22.386	20.837	19.779	18.999	18.392	22.856	21.441	20.476	19.763	19.209
Rel avg	0.163	0.150	0.141	0.135	0.130	0.165	0.154	0.146	0.140	0.136	0.169	0.158	0.151	0.146	0.142

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	12.931	11.199	10.016	9.144	8.465	11.566	10.016	8.959	8.178	7.572	10.558	9.144	8.178	7.466	6.912
2nd Year	15.643	14.244	13.335	12.692	12.212	14.534	13.335	12.560	12.015	11.611	13.746	12.692	12.015	11.542	11.192
3rd Year	17.949	16.744	15.978	15.446	15.054	16.992	15.978	15.337	14.895	14.570	16.323	15.446	14.895	14.516	14.239
4th Year	19.991	18.917	18.242	17.778	17.439	19.137	18.242	17.684	17.301	17.023	18.545	17.778	17.301	16.976	16.740
5th Year						21.064	20.255	19.753	19.412	19.164	20.528	19.838	19.412	19.122	18.913
6th Year											22.336	21.703	21.314	21.051	20.861
Avg p.a.e.	16.629	15.276	14.393	13.765	13.293	16.659	15.565	14.858	14.360	13.988	17.006	16.100	15.519	15.112	14.809
Rel avg	0.123	0.113	0.106	0.102	0.098	0.123	0.115	0.110	0.106	0.103	0.126	0.119	0.115	0.112	0.109

Projected Absolute Errors (State)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 1] **(Pooled Mean = 3.893, Estim Std Dev = 5.170, Avg D = 0.225)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.363	0.315	0.281	0.257	0.238	0.325	0.281	0.252	0.230	0.213	0.297	0.257	0.230	0.210	0.194
2nd Year	0.588	0.540	0.506	0.482	0.463	0.550	0.506	0.477	0.455	0.438	0.522	0.482	0.455	0.435	0.419
3rd Year	0.813	0.764	0.731	0.707	0.688	0.775	0.731	0.702	0.680	0.663	0.746	0.707	0.680	0.660	0.644
4th Year	1.038	0.989	0.956	0.932	0.913	1.000	0.956	0.926	0.904	0.887	0.971	0.932	0.904	0.884	0.869
5th Year						1.225	1.181	1.151	1.129	1.112	1.196	1.156	1.129	1.109	1.094
6th Year											1.421	1.381	1.354	1.334	1.319
Avg p.a.e.	0.701	0.652	0.619	0.594	0.575	0.775	0.731	0.702	0.680	0.663	0.859	0.819	0.792	0.772	0.756
Rel avg	0.180	0.167	0.159	0.153	0.148	0.199	0.188	0.180	0.175	0.170	0.221	0.210	0.203	0.198	0.194

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.363	0.315	0.281	0.257	0.238	0.325	0.281	0.252	0.230	0.213	0.297	0.257	0.230	0.210	0.194
2nd Year	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225	0.225
3rd Year	0.407	0.382	0.366	0.353	0.344	0.387	0.366	0.351	0.340	0.331	0.373	0.353	0.340	0.330	0.322
4th Year	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337	0.337
5th Year						0.459	0.443	0.432	0.424	0.417	0.449	0.434	0.424	0.416	0.410
6th Year											0.644	0.614	0.594	0.579	0.567
Avg p.a.e.	0.333	0.315	0.302	0.293	0.286	0.347	0.330	0.319	0.311	0.305	0.387	0.370	0.358	0.349	0.343
Rel avg	0.086	0.081	0.078	0.075	0.073	0.089	0.085	0.082	0.080	0.078	0.100	0.095	0.092	0.090	0.088

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Projected Absolute Errors (State)

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] **(Pooled Mean = 3.893, Estim Std Dev = 5.170, Avg D = 0.225)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.363	0.315	0.281	0.257	0.238	0.325	0.281	0.252	0.230	0.213	0.297	0.257	0.230	0.210	0.194
2nd Year	0.543	0.495	0.461	0.437	0.418	0.505	0.461	0.432	0.410	0.393	0.477	0.437	0.410	0.390	0.374
3rd Year	0.618	0.569	0.536	0.511	0.492	0.579	0.536	0.506	0.484	0.467	0.551	0.511	0.484	0.464	0.449
4th Year	0.675	0.626	0.593	0.569	0.549	0.637	0.593	0.563	0.541	0.524	0.608	0.569	0.541	0.521	0.506
5th Year						0.685	0.641	0.612	0.590	0.573	0.656	0.617	0.590	0.570	0.554
6th Year											0.699	0.659	0.632	0.612	0.597
Avg p.a.e.	0.550	0.501	0.468	0.443	0.424	0.546	0.503	0.473	0.451	0.434	0.548	0.508	0.481	0.461	0.446
Rel avg	0.141	0.129	0.120	0.114	0.109	0.140	0.129	0.121	0.116	0.111	0.141	0.131	0.124	0.118	0.114

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.363	0.315	0.281	0.257	0.238	0.325	0.281	0.252	0.230	0.213	0.297	0.257	0.230	0.210	0.194
2nd Year	0.405	0.362	0.334	0.314	0.298	0.371	0.334	0.309	0.292	0.279	0.347	0.314	0.292	0.276	0.265
3rd Year	0.444	0.405	0.379	0.362	0.348	0.413	0.379	0.358	0.343	0.332	0.391	0.362	0.343	0.330	0.320
4th Year	0.479	0.443	0.420	0.404	0.392	0.450	0.420	0.401	0.387	0.377	0.430	0.404	0.387	0.376	0.367
5th Year						0.485	0.457	0.439	0.427	0.418	0.466	0.442	0.427	0.417	0.409
6th Year											0.500	0.477	0.463	0.454	0.447
Avg p.a.e.	0.423	0.381	0.354	0.334	0.319	0.409	0.374	0.352	0.336	0.324	0.405	0.376	0.357	0.344	0.334
Rel avg	0.109	0.098	0.091	0.086	0.082	0.105	0.096	0.090	0.086	0.083	0.104	0.097	0.092	0.088	0.086

Projected Absolute Errors (State)

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 1] (Pooled Mean = 0.078, Estim Std Dev = 0.267, Avg D = 0.011)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	264	352	440	528	616	330	440	550	660	770	396	528	660	792	924
1st Year	0.013	0.011	0.010	0.009	0.009	0.012	0.010	0.009	0.008	0.008	0.011	0.009	0.008	0.008	0.007
2nd Year	0.024	0.023	0.021	0.021	0.020	0.023	0.021	0.020	0.020	0.019	0.022	0.021	0.020	0.019	0.018
3rd Year	0.036	0.034	0.033	0.032	0.031	0.034	0.033	0.032	0.031	0.030	0.033	0.032	0.031	0.030	0.029
4th Year	0.047	0.045	0.044	0.043	0.042	0.045	0.044	0.043	0.042	0.041	0.044	0.043	0.042	0.041	0.041
5th Year						0.057	0.055	0.054	0.053	0.052	0.056	0.054	0.053	0.052	0.052
6th Year											0.067	0.065	0.064	0.064	0.063
Avg p.a.e.	0.030	0.028	0.027	0.026	0.025	0.034	0.033	0.032	0.031	0.030	0.039	0.037	0.036	0.036	0.035
Rel p.a.e.	0.385	0.362	0.347	0.335	0.326	0.439	0.419	0.405	0.394	0.387	0.497	0.479	0.466	0.457	0.450

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	264	352	440	528	616	330	440	550	660	770	396	528	660	792	924
1st Year	0.013	0.011	0.010	0.009	0.009	0.012	0.010	0.009	0.008	0.008	0.011	0.009	0.008	0.008	0.007
2nd Year	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
3rd Year	0.018	0.017	0.016	0.016	0.016	0.017	0.016	0.016	0.015	0.015	0.017	0.016	0.015	0.015	0.015
4th Year	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
5th Year						0.021	0.021	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.019
6th Year											0.029	0.028	0.027	0.027	0.026
Avg p.a.e.	0.015	0.014	0.014	0.013	0.013	0.016	0.015	0.015	0.014	0.014	0.018	0.017	0.016	0.016	0.016
Rel p.a.e.	0.189	0.181	0.175	0.171	0.167	0.200	0.193	0.188	0.184	0.181	0.225	0.217	0.212	0.207	0.204

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Projected Absolute Errors (State)

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] (Pooled Mean = 0.078, Estim Std Dev = 0.267, Avg D = 0.011)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	264	352	440	528	616	330	440	550	660	770	396	528	660	792	924
1st Year	0.013	0.011	0.010	0.009	0.009	0.012	0.010	0.009	0.008	0.008	0.011	0.009	0.008	0.008	0.007
2nd Year	0.022	0.020	0.019	0.018	0.018	0.021	0.019	0.018	0.017	0.017	0.020	0.018	0.017	0.017	0.016
3rd Year	0.026	0.024	0.023	0.022	0.021	0.024	0.023	0.022	0.021	0.020	0.023	0.022	0.021	0.020	0.020
4th Year	0.029	0.027	0.026	0.025	0.024	0.027	0.026	0.025	0.024	0.023	0.026	0.025	0.024	0.023	0.023
5th Year						0.030	0.028	0.027	0.026	0.026	0.029	0.027	0.026	0.026	0.025
6th Year											0.031	0.029	0.028	0.028	0.027
Avg p.a.e.	0.022	0.021	0.019	0.019	0.018	0.023	0.021	0.020	0.019	0.019	0.023	0.022	0.021	0.020	0.020
Rel p.a.e.	0.288	0.266	0.250	0.239	0.230	0.293	0.272	0.259	0.248	0.240	0.299	0.280	0.268	0.258	0.251

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	264	352	440	528	616	330	440	550	660	770	396	528	660	792	924
1st Year	0.013	0.011	0.010	0.009	0.009	0.012	0.010	0.009	0.008	0.008	0.011	0.009	0.008	0.008	0.007
2nd Year	0.016	0.014	0.014	0.013	0.012	0.015	0.014	0.013	0.012	0.012	0.014	0.013	0.012	0.012	0.011
3rd Year	0.018	0.017	0.016	0.016	0.015	0.017	0.016	0.016	0.015	0.015	0.017	0.016	0.015	0.015	0.014
4th Year	0.020	0.019	0.019	0.018	0.018	0.019	0.019	0.018	0.018	0.017	0.019	0.018	0.018	0.017	0.017
5th Year						0.021	0.021	0.020	0.020	0.020	0.021	0.020	0.020	0.019	0.019
6th Year											0.023	0.022	0.022	0.021	0.021
Avg p.a.e.	0.017	0.016	0.015	0.014	0.014	0.017	0.016	0.015	0.015	0.014	0.017	0.016	0.016	0.015	0.015
Rel p.a.e.	0.217	0.200	0.188	0.180	0.174	0.218	0.203	0.194	0.188	0.183	0.222	0.210	0.203	0.198	0.194

Projected Absolute Errors (State)

Item #7A - Number of students per FTE teacher. (public schools)

[Model 1] (Pooled Mean = 14.882, Estim Std Dev = 3.981, Avg D = 0.223)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.280	0.242	0.217	0.198	0.183	0.250	0.217	0.194	0.177	0.164	0.228	0.198	0.177	0.162	0.150
2nd Year	0.503	0.466	0.440	0.421	0.406	0.474	0.440	0.417	0.400	0.387	0.452	0.421	0.400	0.385	0.373
3rd Year	0.726	0.689	0.663	0.644	0.630	0.697	0.663	0.640	0.623	0.610	0.675	0.644	0.623	0.608	0.596
4th Year	0.950	0.912	0.887	0.868	0.853	0.920	0.887	0.864	0.847	0.834	0.898	0.868	0.847	0.831	0.819
5th Year						1.143	1.110	1.087	1.070	1.057	1.121	1.091	1.070	1.055	1.043
6th Year											1.345	1.314	1.293	1.278	1.266
Avg p.a.e.	0.615	0.577	0.552	0.533	0.518	0.697	0.663	0.640	0.623	0.610	0.787	0.756	0.735	0.720	0.708
Rel p.a.e.	0.041	0.039	0.037	0.036	0.035	0.047	0.045	0.043	0.042	0.041	0.053	0.051	0.049	0.048	0.048

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.280	0.242	0.217	0.198	0.183	0.250	0.217	0.194	0.177	0.164	0.228	0.198	0.177	0.162	0.150
2nd Year	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223
3rd Year	0.363	0.344	0.332	0.322	0.315	0.348	0.332	0.320	0.312	0.305	0.337	0.322	0.312	0.304	0.298
4th Year	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.335
5th Year						0.429	0.416	0.408	0.401	0.396	0.421	0.409	0.401	0.395	0.391
6th Year											0.590	0.567	0.551	0.540	0.531
Avg p.a.e.	0.300	0.286	0.277	0.270	0.264	0.317	0.305	0.296	0.290	0.285	0.356	0.342	0.333	0.326	0.321
Rel p.a.e.	0.020	0.019	0.019	0.018	0.018	0.021	0.020	0.020	0.019	0.019	0.024	0.023	0.022	0.022	0.022

Projected Absolute Errors (State)

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 14.882, Estim Std Dev = 3.981, Avg D = 0.223)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.280	0.242	0.217	0.198	0.183	0.250	0.217	0.194	0.177	0.164	0.228	0.198	0.177	0.162	0.150
2nd Year	0.458	0.421	0.395	0.376	0.362	0.429	0.395	0.372	0.356	0.342	0.407	0.376	0.356	0.340	0.328
3rd Year	0.532	0.495	0.469	0.450	0.436	0.503	0.469	0.446	0.430	0.416	0.481	0.450	0.430	0.414	0.402
4th Year	0.589	0.552	0.526	0.507	0.493	0.560	0.526	0.503	0.486	0.473	0.538	0.507	0.486	0.471	0.459
5th Year						0.607	0.574	0.551	0.534	0.521	0.586	0.555	0.534	0.519	0.507
6th Year											0.628	0.597	0.576	0.561	0.549
Avg p.a.e.	0.465	0.427	0.402	0.383	0.368	0.470	0.436	0.413	0.397	0.383	0.478	0.447	0.426	0.411	0.399
Rel p.a.e.	0.031	0.029	0.027	0.026	0.025	0.032	0.029	0.028	0.027	0.026	0.032	0.030	0.029	0.028	0.027

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.280	0.242	0.217	0.198	0.183	0.250	0.217	0.194	0.177	0.164	0.228	0.198	0.177	0.162	0.150
2nd Year	0.332	0.301	0.281	0.267	0.256	0.307	0.281	0.264	0.251	0.242	0.290	0.267	0.251	0.241	0.233
3rd Year	0.377	0.350	0.333	0.321	0.312	0.356	0.333	0.318	0.308	0.301	0.341	0.321	0.308	0.300	0.294
4th Year	0.417	0.393	0.378	0.367	0.360	0.398	0.378	0.365	0.356	0.350	0.385	0.367	0.356	0.349	0.344
5th Year						0.436	0.418	0.406	0.399	0.393	0.424	0.408	0.399	0.392	0.387
6th Year											0.460	0.446	0.437	0.431	0.426
Avg p.a.e.	0.351	0.322	0.302	0.288	0.278	0.349	0.325	0.309	0.298	0.290	0.355	0.334	0.321	0.312	0.306
Rel p.a.e.	0.024	0.022	0.020	0.019	0.019	0.023	0.022	0.021	0.020	0.019	0.024	0.022	0.022	0.021	0.021

Projected Absolute Errors (State)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)

[Model 1] (Pooled Mean = 0.997, Estim Std Dev = 0.052, Avg D = 0.001)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.004	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.002	0.002
2nd Year	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003
3rd Year	0.006	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005
4th Year	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006
5th Year						0.009	0.008	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.007
6th Year											0.010	0.009	0.009	0.009	0.009
Avg p.a.e.	0.006	0.005	0.005	0.005	0.004	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.005
Rel p.a.e.	0.006	0.005	0.005	0.005	0.004	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.005

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.004	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.002	0.002
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
6th Year											0.005	0.005	0.004	0.004	0.004
Avg p.a.e.	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.002
Rel p.a.e.	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.002

Projected Absolute Errors (State)

Item #8A - Percentage of schools in which various programs and services were available to students. (public schools)

[Model 3A] **(Pooled Mean = 0.997, Estim Std Dev = 0.052, Avg D = 0.001)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.004	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.002	0.002
2nd Year	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.003	0.003
3rd Year	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
4th Year	0.006	0.005	0.005	0.005	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
5th Year						0.005	0.005	0.005	0.005	0.004	0.005	0.005	0.005	0.004	0.004
6th Year											0.005	0.005	0.005	0.005	0.004
Avg p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
Rel p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.004	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.002	0.002
2nd Year	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.002
3rd Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
4th Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
5th Year						0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
6th Year											0.004	0.004	0.003	0.003	0.003
Avg p.a.e.	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Rel p.a.e.	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003

Projected Absolute Errors (State)

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 1] (Pooled Mean = 0.977, Estim Std Dev = 0.148, Avg D = 0.004)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.007	0.007	0.006	0.006
2nd Year	0.015	0.013	0.013	0.012	0.011	0.014	0.013	0.012	0.011	0.011	0.013	0.012	0.011	0.010	0.010
3rd Year	0.019	0.018	0.017	0.016	0.016	0.018	0.017	0.016	0.016	0.015	0.017	0.016	0.016	0.015	0.014
4th Year	0.024	0.022	0.021	0.021	0.020	0.023	0.021	0.021	0.020	0.019	0.022	0.021	0.020	0.019	0.019
5th Year						0.027	0.026	0.025	0.024	0.024	0.026	0.025	0.024	0.024	0.023
6th Year											0.031	0.030	0.029	0.028	0.028
Avg p.a.e.	0.017	0.016	0.015	0.014	0.014	0.018	0.017	0.016	0.016	0.015	0.020	0.019	0.018	0.017	0.017
Rel p.a.e.	0.018	0.016	0.015	0.014	0.014	0.019	0.017	0.017	0.016	0.015	0.020	0.019	0.018	0.018	0.017

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.007	0.007	0.006	0.006
2nd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3rd Year	0.010	0.009	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.008	0.009	0.008	0.008	0.007	0.007
4th Year	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
5th Year						0.010	0.010	0.009	0.009	0.009	0.010	0.009	0.009	0.009	0.009
6th Year											0.015	0.014	0.013	0.013	0.013
Avg p.a.e.	0.008	0.007	0.007	0.007	0.006	0.008	0.007	0.007	0.007	0.007	0.009	0.008	0.008	0.008	0.008
Rel p.a.e.	0.008	0.007	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.009	0.009	0.008	0.008	0.008

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Projected Absolute Errors (State)

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.977, Estim Std Dev = 0.148, Avg D = 0.004)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.007	0.007	0.006	0.006
2nd Year	0.014	0.013	0.012	0.011	0.010	0.013	0.012	0.011	0.010	0.010	0.012	0.011	0.010	0.010	0.009
3rd Year	0.015	0.014	0.013	0.012	0.012	0.014	0.013	0.012	0.012	0.011	0.014	0.012	0.012	0.011	0.011
4th Year	0.017	0.015	0.014	0.014	0.013	0.016	0.014	0.013	0.013	0.012	0.015	0.014	0.013	0.012	0.012
5th Year						0.016	0.015	0.014	0.014	0.013	0.016	0.015	0.014	0.013	0.013
6th Year											0.016	0.015	0.015	0.014	0.014
Avg p.a.e.	0.014	0.013	0.012	0.011	0.011	0.014	0.012	0.012	0.011	0.010	0.013	0.012	0.012	0.011	0.011
Rel p.a.e.	0.014	0.013	0.012	0.011	0.011	0.014	0.013	0.012	0.011	0.011	0.014	0.013	0.012	0.011	0.011

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	130	173	216	259	302	162	216	270	324	378	194	259	324	389	454
1st Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.009	0.007	0.007	0.006	0.006
2nd Year	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.007
3rd Year	0.012	0.010	0.010	0.009	0.008	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.008
4th Year	0.012	0.011	0.010	0.010	0.009	0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.008
5th Year						0.012	0.011	0.010	0.010	0.009	0.011	0.010	0.010	0.009	0.009
6th Year											0.012	0.011	0.010	0.010	0.010
Avg p.a.e.	0.011	0.010	0.009	0.009	0.008	0.011	0.009	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008
Rel p.a.e.	0.012	0.010	0.009	0.009	0.008	0.011	0.010	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008

Projected Absolute Errors (State)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 1] **(Pooled Mean = 0.413, Estim Std Dev = 0.492, Avg D = 0.006)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.015	0.013	0.012	0.011	0.010	0.013	0.012	0.010	0.009	0.009	0.012	0.011	0.009	0.009	0.008
2nd Year	0.021	0.019	0.018	0.017	0.016	0.020	0.018	0.017	0.016	0.015	0.019	0.017	0.016	0.015	0.014
3rd Year	0.028	0.026	0.024	0.023	0.023	0.026	0.024	0.023	0.022	0.022	0.025	0.023	0.022	0.022	0.021
4th Year	0.034	0.032	0.031	0.030	0.029	0.033	0.031	0.030	0.029	0.028	0.032	0.030	0.029	0.028	0.027
5th Year						0.039	0.037	0.036	0.035	0.035	0.038	0.036	0.035	0.034	0.034
6th Year											0.045	0.043	0.042	0.041	0.040
Avg p.a.e.	0.025	0.023	0.021	0.020	0.019	0.026	0.024	0.023	0.022	0.022	0.028	0.027	0.026	0.025	0.024
Rel p.a.e.	0.060	0.055	0.051	0.049	0.047	0.064	0.059	0.056	0.054	0.052	0.069	0.065	0.062	0.060	0.058

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.015	0.013	0.012	0.011	0.010	0.013	0.012	0.010	0.009	0.009	0.012	0.011	0.009	0.009	0.008
2nd Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
3rd Year	0.014	0.013	0.012	0.012	0.011	0.013	0.012	0.012	0.011	0.011	0.013	0.012	0.011	0.011	0.010
4th Year	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
5th Year						0.015	0.014	0.014	0.013	0.013	0.014	0.014	0.013	0.013	0.013
6th Year											0.021	0.020	0.019	0.019	0.018
Avg p.a.e.	0.011	0.010	0.010	0.010	0.009	0.011	0.011	0.010	0.010	0.010	0.013	0.012	0.012	0.011	0.011
Rel p.a.e.	0.027	0.025	0.024	0.023	0.023	0.028	0.026	0.025	0.024	0.024	0.031	0.029	0.028	0.027	0.026

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Projected Absolute Errors (State)

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] (Pooled Mean = 0.413, Estim Std Dev = 0.492, Avg D = 0.006)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.015	0.013	0.012	0.011	0.010	0.013	0.012	0.010	0.009	0.009	0.012	0.011	0.009	0.009	0.008
2nd Year	0.020	0.018	0.017	0.016	0.015	0.018	0.017	0.015	0.015	0.014	0.017	0.016	0.015	0.014	0.013
3rd Year	0.022	0.020	0.019	0.018	0.017	0.021	0.019	0.018	0.017	0.016	0.019	0.018	0.017	0.016	0.015
4th Year	0.024	0.022	0.020	0.019	0.019	0.022	0.020	0.019	0.018	0.018	0.021	0.019	0.018	0.018	0.017
5th Year						0.024	0.022	0.021	0.020	0.019	0.023	0.021	0.020	0.019	0.018
6th Year											0.024	0.022	0.021	0.020	0.020
Avg p.a.e.	0.020	0.018	0.017	0.016	0.015	0.020	0.018	0.017	0.016	0.015	0.019	0.018	0.017	0.016	0.015
Rel p.a.e.	0.049	0.044	0.041	0.038	0.037	0.048	0.043	0.040	0.038	0.037	0.047	0.043	0.040	0.038	0.037

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.015	0.013	0.012	0.011	0.010	0.013	0.012	0.010	0.009	0.009	0.012	0.011	0.009	0.009	0.008
2nd Year	0.016	0.014	0.013	0.012	0.011	0.014	0.013	0.012	0.011	0.010	0.013	0.012	0.011	0.010	0.009
3rd Year	0.017	0.015	0.014	0.013	0.012	0.015	0.014	0.013	0.012	0.011	0.014	0.013	0.012	0.011	0.011
4th Year	0.017	0.016	0.015	0.014	0.013	0.016	0.015	0.014	0.013	0.013	0.015	0.014	0.013	0.012	0.012
5th Year						0.017	0.015	0.015	0.014	0.014	0.016	0.015	0.014	0.013	0.013
6th Year											0.017	0.016	0.015	0.014	0.014
Avg p.a.e.	0.016	0.014	0.013	0.012	0.012	0.015	0.014	0.013	0.012	0.011	0.015	0.013	0.012	0.012	0.011
Rel p.a.e.	0.039	0.035	0.032	0.030	0.028	0.037	0.033	0.030	0.029	0.027	0.035	0.032	0.030	0.028	0.027

Projected Absolute Errors (State)

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)

[Model 1] (Pooled Mean = 0.021, Estim Std Dev = 0.144, Avg D = 0.006)

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.002
2nd Year	0.010	0.010	0.009	0.009	0.009	0.010	0.009	0.009	0.009	0.008	0.009	0.009	0.009	0.008	0.008
3rd Year	0.016	0.016	0.015	0.015	0.015	0.016	0.015	0.015	0.015	0.014	0.015	0.015	0.015	0.014	0.014
4th Year	0.022	0.021	0.021	0.021	0.021	0.022	0.021	0.021	0.020	0.020	0.021	0.021	0.020	0.020	0.020
5th Year						0.028	0.027	0.027	0.026	0.026	0.027	0.027	0.026	0.026	0.026
6th Year											0.033	0.033	0.032	0.032	0.032
Avg p.a.e.	0.013	0.013	0.012	0.012	0.012	0.016	0.015	0.015	0.015	0.014	0.018	0.018	0.018	0.017	0.017
Rel p.a.e.	0.618	0.591	0.572	0.558	0.547	0.734	0.710	0.693	0.681	0.671	0.856	0.834	0.819	0.808	0.799

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.002
2nd Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
3rd Year	0.008	0.008	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
4th Year	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
5th Year						0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6th Year											0.014	0.013	0.013	0.013	0.013
Avg p.a.e.	0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.008	0.008
Rel p.a.e.	0.318	0.308	0.301	0.296	0.292	0.344	0.335	0.329	0.324	0.321	0.389	0.379	0.373	0.368	0.364

Item #11A - Percentage of full time teachers who were newly hired and who were first time teachers. (public schools)

[Model 3A] **(Pooled Mean = 0.021, Estim Std Dev = 0.144, Avg D = 0.006)**

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.002
2nd Year	0.009	0.009	0.008	0.008	0.008	0.009	0.008	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.007
3rd Year	0.011	0.010	0.010	0.010	0.010	0.011	0.010	0.010	0.009	0.009	0.010	0.010	0.009	0.009	0.009
4th Year	0.013	0.012	0.012	0.011	0.011	0.012	0.012	0.011	0.011	0.011	0.012	0.011	0.011	0.011	0.011
5th Year						0.013	0.013	0.012	0.012	0.012	0.013	0.013	0.012	0.012	0.012
6th Year											0.014	0.014	0.013	0.013	0.013
Avg p.a.e.	0.009	0.009	0.008	0.008	0.008	0.010	0.009	0.009	0.009	0.008	0.010	0.010	0.009	0.009	0.009
Rel p.a.e.	0.433	0.406	0.387	0.373	0.362	0.454	0.429	0.413	0.400	0.391	0.475	0.453	0.437	0.426	0.417

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	701	934	1,168	1,402	1,635	876	1,168	1,460	1,752	2,044	1,051	1,402	1,752	2,102	2,453
1st Year	0.004	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.002
2nd Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.005	0.006	0.006	0.005	0.005	0.005
3rd Year	0.008	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
4th Year	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
5th Year						0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
6th Year											0.011	0.011	0.011	0.011	0.011
Avg p.a.e.	0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007
Rel p.a.e.	0.328	0.310	0.298	0.290	0.284	0.346	0.332	0.323	0.317	0.313	0.368	0.357	0.349	0.344	0.341

Part II – Error Projections for Selected Models, Policy Variables, Cost Ratios, and Periodicities

Appendix B

Projected Absolute Errors for an Alternating Large-and-Small-Sample Design ("Interleaved 3-6-9 Design") with Selected Periodicities

Public Schools: National-level U.S. and States of California, Iowa, and New York

SASS Results, Estimates, and Projected Absolute Errors (U.S.) Public Schools
Alternating Large-and-Small-Sample Design: Interleaved 3-6-9
under Models 3A and 4M

[SASS Results]

Item	Source Component	1987 - 88 N*	1987 - 88 N	1987 - 88 Mean	1987 - 88 Std Dev	1990 - 91 N*	1990 - 91 N	1990 - 91 Mean	1990 - 91 Std Dev	1993 - 94 N*	1993 - 94 N	1993 - 94 Mean	1993 - 94 Std Dev
#1	School (Pub)	8,326	4,659	94.527	128.412	8,969	5,458	101.586	150.210	8,767	4,787	117.660	169.070
#4	School (Pub)	8,326	8,326	2.952	4.155	8,969	8,969	3.477	3.839				
#6	Adminr (Pub & Pri)	10,955	10,955	0.088	0.284	11,811	11,811	0.091	0.287	11,841	11,841	0.105	0.306
#7A	School (Pub)	8,326	8,326	17.540	5.101	8,969	8,825	16.512	5.666	8,767	8,551	16.884	5.052
#7B	School (Pri)	2,459	2,459	15.793	7.343	2,620	2,505	14.749	6.543	2,585	2,426	16.480	30.485
#8A	School (Pub)	8,326	8,326	0.993	0.081	8,969	8,969	0.991	0.092	8,767	8,767	0.994	0.080
#8B	School (Pri)	2,459	2,459	0.838	0.368	2,620	2,620	0.844	0.363	2,585	2,585	0.841	0.365
#9	Adminr (Pub)	8,519	8,519	0.955	0.207	9,054	9,054	0.979	0.145	9,098	9,098	0.981	0.136
#10A	Teacher (Pub)	40,593	40,593	0.351	0.477	46,705	46,705	0.396	0.489	47,105	47,105	0.410	0.492
#10B	Teacher (Pri)	6,764	6,764	0.212	0.409	6,642	6,642	0.301	0.459	8,372	8,372	0.295	0.456
#11A	Teacher (Pub)	40,593	40,593	0.034	0.182	46,705	46,705	0.032	0.175	47,105	47,105	0.036	0.186
#11B	Teacher (Pri)	6,764	6,764	0.079	0.270	6,642	6,642	0.057	0.232	8,372	8,372	0.057	0.232

* denotes actual sample size.

[Estimates]

Item	Source Component	Pooled Mean	Estim Std Dev	Avg D	Ref N
#1	School (Pub)	104.591	150.153	3.855	9,000
#4	School (Pub)	3.214	4.000	0.175	9,000
#6	Adminr (Pub & Pri)	0.095	0.292	0.003	11,500
#7A	School (Pub)	16.979	5.280	0.234	9,000
#7B	School (Pri)				
#8A	School (Pub)	0.993	0.084	0.001	9,000
#8B	School (Pri)				
#9	Adminr (Pub)	0.972	0.166	0.004	9,000
#10A	Teacher (Pub)	0.386	0.486	0.010	48,000
#10B	Teacher (Pri)				
#11A	Teacher (Pub)	0.034	0.181	0.001	48,000
#11B	Teacher (Pri)				

[Projected] National composite Interleaved 3-6-9

Item	Rel p.a.e. Mod 3A Cost Ratio 0.3	0.5	0.7	Rel p.a.e. Mod 4M Cost Ratio 0.3	0.5	0.7
#1	0.044	0.038	0.034	0.036	0.031	0.029
#4	0.048	0.042	0.039	0.040	0.036	0.034
#6	0.062	0.052	0.046	0.051	0.042	0.037
#7A	0.012	0.011	0.010	0.010	0.009	0.009
#7B						
#8A	0.002	0.001	0.001	0.002	0.001	0.001
#8B						
#9	0.005	0.005	0.004	0.004	0.004	0.003
#10A	0.021	0.019	0.017	0.018	0.016	0.015
#10B						
#11A	0.058	0.049	0.044	0.047	0.040	0.036
#11B						
Avg	0.019	0.016	0.015	0.016	0.014	0.013

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 3A] (Pooled Mean = 104.591, Estim Std Dev = 150.153, Avg D = 3.855)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						1.635	1.416	1.266	1.156	1.070	1.635	1.416	1.266	1.156	1.070
2nd Year						4.719	4.500	4.351	4.240	4.155	4.719	4.500	4.351	4.240	4.155
3rd Year						5.997	5.778	5.628	5.518	5.432	5.997	5.778	5.628	5.518	5.432
4th Year	3.655	3.165	2.831	2.585	2.393	6.977	6.758	6.608	6.498	6.412	3.655	3.165	2.831	2.585	2.393
5th Year	6.740	6.250	5.916	5.669	5.477	7.803	7.584	7.435	7.325	7.239	6.740	6.250	5.916	5.669	5.477
6th Year	8.017	7.527	7.193	6.947	6.755	8.532	8.313	8.163	8.053	7.967	8.017	7.527	7.193	6.947	6.755
Avg p.a.e.	5.824	5.301	4.939	4.669	4.457	5.273	5.003	4.813	4.669	4.555	4.572	4.199	3.939	3.744	3.589
Rel p.a.e.	0.056	0.051	0.047	0.045	0.043	0.050	0.048	0.046	0.045	0.044	0.044	0.040	0.038	0.036	0.034

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						1.635	1.416	1.266	1.156	1.070	1.635	1.416	1.266	1.156	1.070
2nd Year						3.491	3.394	3.334	3.294	3.265	3.491	3.394	3.334	3.294	3.265
3rd Year						4.658	4.586	4.542	4.513	4.491	4.658	4.586	4.542	4.513	4.491
4th Year	3.655	3.165	2.831	2.585	2.393	5.587	5.527	5.490	5.466	5.448	3.655	3.165	2.831	2.585	2.393
5th Year	4.783	4.420	4.187	4.024	3.904	6.382	6.329	6.297	6.276	6.261	4.783	4.420	4.187	4.024	3.904
6th Year	5.691	5.390	5.200	5.070	4.975	7.088	7.041	7.012	6.993	6.979	5.691	5.390	5.200	5.070	4.975
Avg p.a.e.	4.634	4.225	3.950	3.750	3.595	4.344	4.192	4.085	4.004	3.939	3.719	3.441	3.252	3.111	3.000
Rel p.a.e.	0.044	0.040	0.038	0.036	0.034	0.042	0.040	0.039	0.038	0.038	0.036	0.033	0.031	0.030	0.029

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] (Pooled Mean = 3.214, Estim Std Dev = 4.000, Avg D = 0.175)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.044	0.038	0.034	0.031	0.029	0.044	0.038	0.034	0.031	0.029
2nd Year						0.183	0.178	0.174	0.171	0.168	0.183	0.178	0.174	0.171	0.168
3rd Year						0.241	0.236	0.232	0.229	0.226	0.241	0.236	0.232	0.229	0.226
4th Year	0.097	0.084	0.075	0.069	0.064	0.286	0.280	0.276	0.273	0.271	0.097	0.084	0.075	0.069	0.064
5th Year	0.237	0.224	0.215	0.209	0.204	0.323	0.318	0.314	0.311	0.308	0.237	0.224	0.215	0.209	0.204
6th Year	0.295	0.282	0.273	0.267	0.262	0.356	0.351	0.347	0.344	0.341	0.295	0.282	0.273	0.267	0.262
Avg p.a.e.	0.190	0.175	0.164	0.157	0.150	0.200	0.191	0.185	0.181	0.177	0.154	0.143	0.135	0.129	0.124
Rel p.a.e.	0.059	0.054	0.051	0.049	0.047	0.062	0.060	0.058	0.056	0.055	0.048	0.044	0.042	0.040	0.039

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.044	0.038	0.034	0.031	0.029	0.044	0.038	0.034	0.031	0.029
2nd Year						0.147	0.145	0.144	0.143	0.143	0.147	0.145	0.144	0.143	0.143
3rd Year						0.203	0.201	0.201	0.200	0.200	0.203	0.201	0.201	0.200	0.200
4th Year	0.097	0.084	0.075	0.069	0.064	0.246	0.245	0.245	0.244	0.244	0.097	0.084	0.075	0.069	0.064
5th Year	0.170	0.163	0.159	0.156	0.154	0.283	0.282	0.282	0.282	0.281	0.170	0.163	0.159	0.156	0.154
6th Year	0.221	0.215	0.212	0.210	0.208	0.316	0.315	0.315	0.314	0.314	0.221	0.215	0.212	0.210	0.208
Avg p.a.e.	0.154	0.144	0.136	0.131	0.127	0.175	0.170	0.166	0.164	0.161	0.130	0.122	0.116	0.112	0.109
Rel p.a.e.	0.048	0.045	0.042	0.041	0.039	0.054	0.053	0.052	0.051	0.050	0.040	0.038	0.036	0.035	0.034

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Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] (Pooled Mean = 0.095, Estim Std Dev = 0.292, Avg D = 0.003)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,380	1,840	2,300	2,760	3,220	6,900	9,200	11,500	13,800	16,100					
1st Year						0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year						0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
3rd Year						0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005
4th Year	0.006	0.005	0.005	0.004	0.004	0.007	0.006	0.006	0.006	0.006	0.006	0.005	0.005	0.004	0.004
5th Year	0.008	0.008	0.007	0.007	0.006	0.007	0.007	0.007	0.006	0.006	0.008	0.008	0.007	0.007	0.006
6th Year	0.009	0.009	0.008	0.008	0.007	0.008	0.007	0.007	0.007	0.007	0.009	0.009	0.008	0.008	0.007
Avg p.a.e.	0.008	0.007	0.007	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.004
Rel p.a.e.	0.084	0.075	0.069	0.064	0.061	0.059	0.055	0.052	0.050	0.048	0.062	0.056	0.052	0.049	0.046

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,380	1,840	2,300	2,760	3,220	6,900	9,200	11,500	13,800	16,100					
1st Year						0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year						0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
3rd Year						0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
4th Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.006	0.005	0.005	0.004	0.004
5th Year	0.007	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.006	0.005	0.005	0.005
6th Year	0.007	0.006	0.006	0.005	0.005	0.006	0.005	0.005	0.005	0.005	0.007	0.006	0.006	0.005	0.005
Avg p.a.e.	0.007	0.006	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
Rel p.a.e.	0.070	0.062	0.056	0.052	0.049	0.045	0.042	0.040	0.039	0.038	0.051	0.046	0.042	0.039	0.037

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 16.979, Estim Std Dev = 5.280, Avg D = 0.234)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.057	0.050	0.045	0.041	0.038	0.057	0.050	0.045	0.041	0.038
2nd Year						0.244	0.237	0.231	0.227	0.224	0.244	0.237	0.231	0.227	0.224
3rd Year						0.322	0.314	0.309	0.305	0.302	0.322	0.314	0.309	0.305	0.302
4th Year	0.129	0.111	0.100	0.091	0.084	0.381	0.373	0.368	0.364	0.361	0.129	0.111	0.100	0.091	0.084
5th Year	0.315	0.298	0.286	0.278	0.271	0.431	0.423	0.418	0.414	0.411	0.315	0.298	0.286	0.278	0.271
6th Year	0.393	0.376	0.364	0.355	0.348	0.475	0.468	0.462	0.458	0.455	0.393	0.376	0.364	0.355	0.348
Avg p.a.e.	0.252	0.232	0.218	0.208	0.200	0.266	0.255	0.247	0.241	0.236	0.204	0.189	0.179	0.171	0.165
Rel p.a.e.	0.015	0.014	0.013	0.012	0.012	0.016	0.015	0.015	0.014	0.014	0.012	0.011	0.011	0.010	0.010

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.057	0.050	0.045	0.041	0.038	0.057	0.050	0.045	0.041	0.038
2nd Year						0.195	0.193	0.192	0.191	0.191	0.195	0.193	0.192	0.191	0.191
3rd Year						0.270	0.269	0.268	0.267	0.267	0.270	0.269	0.268	0.267	0.267
4th Year	0.129	0.111	0.100	0.091	0.084	0.329	0.327	0.327	0.326	0.326	0.129	0.111	0.100	0.091	0.084
5th Year	0.227	0.217	0.212	0.208	0.205	0.378	0.377	0.376	0.376	0.376	0.227	0.217	0.212	0.208	0.205
6th Year	0.294	0.287	0.282	0.279	0.277	0.422	0.421	0.420	0.420	0.419	0.294	0.287	0.282	0.279	0.277
Avg p.a.e.	0.205	0.191	0.181	0.174	0.168	0.233	0.226	0.222	0.218	0.215	0.172	0.162	0.155	0.149	0.145
Rel p.a.e.	0.012	0.011	0.011	0.010	0.010	0.014	0.013	0.013	0.013	0.013	0.010	0.010	0.009	0.009	0.009

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #8A - Percentage of schools in which various programs and services were available. (public schools)

[Model 3A] **(Pooled Mean = 0.993, Estim Std Dev = 0.084, Avg D = 0.001)**

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year						0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
4th Year	0.002	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001
5th Year	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
6th Year	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002
Avg p.a.e.	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
Rel p.a.e.	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
4th Year	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.001	0.001
5th Year	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.001
6th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
Avg p.a.e.	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
Rel p.a.e.	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.972, Estim Std Dev = 0.166, Avg D = 0.004)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
2nd Year						0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
3rd Year						0.007	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006
4th Year	0.004	0.003	0.003	0.003	0.003	0.008	0.008	0.007	0.007	0.007	0.004	0.003	0.003	0.003	0.003
5th Year	0.008	0.007	0.007	0.006	0.006	0.009	0.009	0.008	0.008	0.008	0.008	0.007	0.007	0.006	0.006
6th Year	0.009	0.008	0.008	0.008	0.008	0.010	0.009	0.009	0.009	0.009	0.009	0.008	0.008	0.008	0.008
Avg p.a.e.	0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004
Rel p.a.e.	0.007	0.006	0.006	0.005	0.005	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.005	0.004	0.004

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,080	1,440	1,800	2,160	2,520	5,400	7,200	9,000	10,800	12,600					
1st Year						0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
2nd Year						0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3rd Year						0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4th Year	0.004	0.003	0.003	0.003	0.003	0.006	0.006	0.006	0.006	0.006	0.004	0.003	0.003	0.003	0.003
5th Year	0.005	0.005	0.005	0.004	0.004	0.007	0.007	0.007	0.007	0.007	0.005	0.005	0.005	0.004	0.004
6th Year	0.006	0.006	0.006	0.006	0.006	0.008	0.008	0.008	0.008	0.008	0.006	0.006	0.006	0.006	0.006
Avg p.a.e.	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.003	0.003
Rel p.a.e.	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.003

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] (Pooled Mean = 0.386, Estim Std Dev = 0.486, Avg D = 0.010)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,760	7,680	9,600	11,520	13,440	28,800	38,400	48,000	57,600	67,200					
1st Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
2nd Year						0.010	0.010	0.010	0.009	0.009	0.010	0.010	0.010	0.009	0.009
3rd Year						0.013	0.013	0.013	0.013	0.012	0.013	0.013	0.013	0.013	0.012
4th Year	0.005	0.004	0.004	0.004	0.003	0.016	0.015	0.015	0.015	0.015	0.005	0.004	0.004	0.004	0.003
5th Year	0.013	0.012	0.012	0.011	0.011	0.018	0.017	0.017	0.017	0.017	0.013	0.012	0.012	0.011	0.011
6th Year	0.016	0.015	0.015	0.015	0.014	0.020	0.019	0.019	0.019	0.019	0.016	0.015	0.015	0.015	0.014
Avg p.a.e.	0.010	0.009	0.009	0.008	0.008	0.011	0.010	0.010	0.010	0.010	0.008	0.008	0.007	0.007	0.007
Rel p.a.e.	0.026	0.024	0.023	0.022	0.021	0.028	0.027	0.026	0.026	0.025	0.021	0.020	0.019	0.018	0.017

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,760	7,680	9,600	11,520	13,440	28,800	38,400	48,000	57,600	67,200					
1st Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
2nd Year						0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
3rd Year						0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
4th Year	0.005	0.004	0.004	0.004	0.003	0.014	0.014	0.014	0.014	0.014	0.005	0.004	0.004	0.004	0.003
5th Year	0.009	0.009	0.009	0.009	0.008	0.016	0.016	0.016	0.016	0.016	0.009	0.009	0.009	0.009	0.008
6th Year	0.012	0.012	0.012	0.012	0.011	0.017	0.017	0.017	0.017	0.017	0.012	0.012	0.012	0.012	0.011
Avg p.a.e.	0.008	0.008	0.007	0.007	0.007	0.010	0.009	0.009	0.009	0.009	0.007	0.007	0.006	0.006	0.006
Rel p.a.e.	0.022	0.020	0.019	0.018	0.018	0.025	0.024	0.024	0.023	0.023	0.018	0.017	0.016	0.016	0.015

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #11A - % of full time teachers newly hired and who were first time teachers. (public schools)

[Model 3A] **(Pooled Mean = 0.034, Estim Std Dev = 0.181, Avg D = 0.001)**

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,760	7,680	9,600	11,520	13,440	28,800	38,400	48,000	57,600	67,200					
1st Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
3rd Year						0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
4th Year	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001
5th Year	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.002	0.002	0.002
6th Year	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Avg p.a.e.	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Rel p.a.e.	0.077	0.069	0.064	0.060	0.057	0.060	0.056	0.053	0.051	0.050	0.058	0.053	0.049	0.046	0.044

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National composite Interleaved 3-6-9				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	5,760	7,680	9,600	11,520	13,440	28,800	38,400	48,000	57,600	67,200					
1st Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2nd Year						0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year						0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
4th Year	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001
5th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
6th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Avg p.a.e.	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
Rel p.a.e.	0.062	0.056	0.051	0.048	0.045	0.046	0.044	0.043	0.041	0.040	0.047	0.043	0.040	0.037	0.036

SASS Results, Estimates, and Projected Absolute Errors (California) Public Schools
Alternating Large-and-Small-Sample Design: Interleaved 3-6-9
under Models 3A and 4M

[SASS Results]

Item	Source	1987 - 88 N*	1987 - 88 N	1987 - 88 Mean	1987 - 88 Std Dev	1990 - 91 N*	1990 - 91 N	1990 - 91 Mean	1990 - 91 Std Dev	1993 - 94 N*	1993 - 94 N	1993 - 94 Mean	1993 - 94 Std Dev
#1	School (Pub)	556	253	259.426	270.042	296	155	271.292	304.283	352	159	313.296	309.930
#4	School (Pub)	556	556	2.962	3.913	296	296	4.027	3.865				
#6	Adminr (Pub & Pri)	783	783	0.100	0.301	682	682	0.117	0.321	700	700	0.131	0.337
#7A	School (Pub)	556	556	22.823	5.458	296	285	23.124	7.918	352	319	23.548	5.028
#7B	School (Pri)												
#8A	School (Pub)	556	556	0.988	0.110	296	296	0.980	0.140	352	352	0.985	0.123
#8B	School (Pri)												
#9	Adminr (Pub)	580	580	0.889	0.314	300	300	0.961	0.194	380	380	0.935	0.246
#10A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,833	1,833	0.402	0.490	2,124	2,124	0.405	0.491
#10B	Teacher (Pri)												
#11A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,833	1,833	0.042	0.200	2,124	2,124	0.044	0.206
#11B	Teacher (Pri)												

* denotes actual sample size.

[Estimates]

Item	Source	Pooled Mean	Estim Std Dev	Avg D	Ref N
#1	School (Pub)	281.338	295.278	8.978	350
#4	School (Pub)	3.494	3.889	0.355	350
#6	Adminr (Pub & Pri)	0.116	0.320	0.005	700
#7A	School (Pub)	23.165	6.265	0.121	350
#7B	School (Pri)				
#8A	School (Pub)	0.984	0.125	0.002	350
#8B	School (Pri)				
#9	Adminr (Pub)	0.929	0.256	0.016	350
#10A	Teacher (Pub)	0.404	0.491	0.001	2,100
#10B	Teacher (Pri)				
#11A	Teacher (Pub)	0.043	0.203	0.001	2,100
#11B	Teacher (Pri)				

State composite (CA)

[Projected] **[Interleaved 3-6-9]**

Item	Rel p.a.e. Mod 3A Cost Ratio 0.3	0.5	0.7	Rel p.a.e. Mod 4M Cost Ratio 0.3	0.5	0.7
#1	0.095	0.080	0.072	0.075	0.062	0.055
#4	0.159	0.142	0.133	0.126	0.116	0.110
#6	0.162	0.134	0.119	0.132	0.106	0.093
#7A	0.022	0.018	0.016	0.018	0.014	0.013
#7B						
#8A	0.010	0.008	0.007	0.008	0.007	0.006
#8B						
#9	0.033	0.029	0.027	0.025	0.023	0.021
#10A	0.034	0.027	0.023	0.031	0.024	0.021
#10B						
#11A	0.138	0.110	0.096	0.123	0.096	0.082
#11B						
Avg	0.055	0.046	0.041	0.045	0.037	0.033

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #1 - Number of students served by chapter 1 services. (public schools)
(Pooled Mean = 281.338, Estim Std Dev = 295.278, Avg D = 8.978)

[Model 3A]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						16.301	14.117	12.627	11.526	10.671	16.301	14.117	12.627	11.526	10.671
2nd Year						23.484	21.300	19.809	18.709	17.854	23.484	21.300	19.809	18.709	17.854
3rd Year						26.459	24.275	22.784	21.684	20.829	26.459	24.275	22.784	21.684	20.829
4th Year	36.450	31.567	28.234	25.774	23.862	28.742	26.558	25.067	23.967	23.112	30.163	27.456	25.622	24.278	23.239
5th Year	43.633	38.749	35.417	32.957	31.045	30.666	28.482	26.992	25.892	25.037	33.181	30.435	28.569	27.197	26.134
6th Year	46.608	41.724	38.392	35.932	34.020	32.362	30.178	28.687	27.587	26.732	35.139	32.389	30.520	29.144	28.079
Geo p.a.e.	42.007	37.093	33.734	31.251	29.319	25.711	23.458	21.910	20.760	19.862	26.625	24.133	22.429	21.169	20.187
Rel p.a.e.	0.149	0.132	0.120	0.111	0.104	0.091	0.083	0.078	0.074	0.071	0.095	0.086	0.080	0.075	0.072

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						16.301	14.117	12.627	11.526	10.671	16.301	14.117	12.627	11.526	10.671
2nd Year						17.813	15.839	14.527	13.581	12.864	17.813	15.839	14.527	13.581	12.864
3rd Year						19.207	17.392	16.205	15.364	14.733	19.207	17.392	16.205	15.364	14.733
4th Year	36.450	31.567	28.234	25.774	23.862	20.506	18.816	17.726	16.960	16.391	23.913	21.474	19.867	18.719	17.854
5th Year	37.151	32.373	29.133	26.756	24.920	21.727	20.141	19.126	18.418	17.895	24.969	22.643	21.125	20.050	19.245
6th Year	37.839	33.161	30.006	27.703	25.934	22.884	21.383	20.430	19.769	19.283	25.981	23.755	22.313	21.298	20.542
Geo p.a.e.	37.142	32.360	29.115	26.733	24.891	19.610	17.773	16.555	15.678	15.011	21.031	18.854	17.409	16.367	15.575
Rel p.a.e.	0.132	0.115	0.103	0.095	0.088	0.070	0.063	0.059	0.056	0.053	0.075	0.067	0.062	0.058	0.055

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Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] (Pooled Mean = 3.494, Estim Std Dev = 3.889, Avg D = 0.335)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.215	0.186	0.166	0.152	0.141	0.215	0.186	0.166	0.152	0.141
2nd Year						0.499	0.470	0.450	0.436	0.424	0.499	0.470	0.450	0.436	0.424
3rd Year						0.616	0.587	0.568	0.553	0.542	0.616	0.587	0.568	0.553	0.542
4th Year	0.480	0.416	0.372	0.339	0.314	0.706	0.678	0.658	0.643	0.632	0.674	0.641	0.619	0.603	0.591
5th Year	0.764	0.700	0.656	0.623	0.598	0.782	0.754	0.734	0.719	0.708	0.779	0.745	0.721	0.704	0.691
6th Year	0.881	0.817	0.773	0.741	0.716	0.849	0.821	0.801	0.786	0.775	0.855	0.820	0.796	0.779	0.766
Geo p.a.e.	0.686	0.619	0.573	0.539	0.512	0.560	0.527	0.504	0.487	0.473	0.556	0.521	0.497	0.479	0.465
Rel p.a.e.	0.196	0.177	0.164	0.154	0.147	0.160	0.151	0.144	0.139	0.135	0.159	0.149	0.142	0.137	0.133

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.215	0.186	0.166	0.152	0.141	0.215	0.186	0.166	0.152	0.141
2nd Year						0.356	0.339	0.329	0.322	0.317	0.356	0.339	0.329	0.322	0.317
3rd Year						0.455	0.442	0.434	0.429	0.425	0.455	0.442	0.434	0.429	0.425
4th Year	0.480	0.416	0.372	0.339	0.314	0.536	0.526	0.519	0.514	0.511	0.527	0.509	0.497	0.490	0.484
5th Year	0.558	0.503	0.468	0.442	0.423	0.607	0.597	0.591	0.588	0.585	0.599	0.583	0.573	0.566	0.561
6th Year	0.626	0.578	0.547	0.526	0.510	0.670	0.661	0.656	0.653	0.650	0.663	0.648	0.639	0.633	0.629
Geo p.a.e.	0.551	0.495	0.457	0.429	0.408	0.443	0.424	0.411	0.401	0.393	0.440	0.418	0.404	0.393	0.385
Rel p.a.e.	0.158	0.142	0.131	0.123	0.117	0.127	0.121	0.117	0.115	0.112	0.126	0.120	0.116	0.112	0.110

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] (Pooled Mean = 0.116, Estim Std Dev = 0.320, Avg D = 0.005)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	84	112	140	168	196	420	560	700	840	980					
1st Year						0.012	0.011	0.010	0.009	0.008	0.012	0.011	0.010	0.009	0.008
2nd Year						0.017	0.015	0.014	0.013	0.012	0.017	0.015	0.014	0.013	0.012
3rd Year						0.018	0.017	0.015	0.015	0.014	0.018	0.017	0.015	0.015	0.014
4th Year	0.028	0.024	0.022	0.020	0.018	0.019	0.018	0.017	0.016	0.015	0.021	0.019	0.018	0.017	0.016
5th Year	0.032	0.028	0.026	0.024	0.022	0.021	0.019	0.018	0.017	0.016	0.023	0.021	0.019	0.018	0.017
6th Year	0.034	0.030	0.027	0.025	0.024	0.021	0.020	0.019	0.018	0.017	0.024	0.022	0.020	0.019	0.018
Geo p.a.e.	0.031	0.027	0.025	0.023	0.021	0.018	0.016	0.015	0.014	0.013	0.019	0.017	0.016	0.015	0.014
Rel p.a.e.	0.268	0.236	0.214	0.197	0.185	0.154	0.139	0.129	0.122	0.116	0.162	0.145	0.134	0.126	0.119

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	84	112	140	168	196	420	560	700	840	980					
1st Year						0.012	0.011	0.010	0.009	0.008	0.012	0.011	0.010	0.009	0.008
2nd Year						0.013	0.012	0.010	0.010	0.009	0.013	0.012	0.010	0.010	0.009
3rd Year						0.014	0.012	0.011	0.011	0.010	0.014	0.012	0.011	0.011	0.010
4th Year	0.028	0.024	0.022	0.020	0.018	0.014	0.013	0.012	0.011	0.011	0.017	0.015	0.014	0.013	0.012
5th Year	0.028	0.025	0.022	0.020	0.019	0.015	0.013	0.013	0.012	0.011	0.018	0.016	0.015	0.014	0.013
6th Year	0.028	0.025	0.022	0.021	0.019	0.015	0.014	0.013	0.013	0.012	0.018	0.016	0.015	0.014	0.014
Geo p.a.e.	0.028	0.025	0.022	0.020	0.019	0.014	0.012	0.011	0.011	0.010	0.015	0.014	0.012	0.011	0.011
Rel p.a.e.	0.243	0.212	0.190	0.174	0.161	0.120	0.107	0.099	0.093	0.088	0.132	0.117	0.106	0.099	0.093

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 23.165, Estim Std Dev = 6.265, Avg D = 0.121)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.346	0.300	0.268	0.245	0.226	0.346	0.300	0.268	0.245	0.226
2nd Year						0.443	0.396	0.365	0.341	0.323	0.443	0.396	0.365	0.341	0.323
3rd Year						0.483	0.436	0.405	0.381	0.363	0.483	0.436	0.405	0.381	0.363
4th Year	0.773	0.670	0.599	0.547	0.506	0.513	0.467	0.435	0.412	0.394	0.565	0.506	0.467	0.437	0.415
5th Year	0.870	0.766	0.696	0.644	0.603	0.539	0.493	0.461	0.438	0.420	0.607	0.548	0.508	0.478	0.455
6th Year	0.910	0.806	0.736	0.684	0.643	0.562	0.516	0.484	0.461	0.443	0.633	0.574	0.534	0.505	0.482
Geo p.a.e.	0.849	0.745	0.674	0.622	0.581	0.475	0.428	0.396	0.372	0.353	0.502	0.450	0.414	0.387	0.366
Rel p.a.e.	0.037	0.032	0.029	0.027	0.025	0.021	0.018	0.017	0.016	0.015	0.022	0.019	0.018	0.017	0.016

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.346	0.300	0.268	0.245	0.226	0.346	0.300	0.268	0.245	0.226
2nd Year						0.359	0.315	0.285	0.263	0.246	0.359	0.315	0.285	0.263	0.246
3rd Year						0.372	0.329	0.301	0.280	0.264	0.372	0.329	0.301	0.280	0.264
4th Year	0.773	0.670	0.599	0.547	0.506	0.384	0.343	0.316	0.296	0.282	0.472	0.416	0.378	0.351	0.330
5th Year	0.779	0.677	0.607	0.555	0.515	0.396	0.357	0.330	0.312	0.298	0.482	0.427	0.390	0.364	0.344
6th Year	0.785	0.684	0.614	0.564	0.524	0.408	0.369	0.344	0.326	0.313	0.491	0.438	0.402	0.376	0.357
Geo p.a.e.	0.779	0.677	0.607	0.555	0.515	0.377	0.335	0.306	0.286	0.270	0.416	0.366	0.333	0.309	0.290
Rel p.a.e.	0.034	0.029	0.026	0.024	0.022	0.016	0.014	0.013	0.012	0.012	0.018	0.016	0.014	0.013	0.013

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #8A - Percentage of schools in which various programs and services were available. (public schools)

[Model 3A] **(Pooled Mean = 0.984, Estim Std Dev = 0.125, Avg D = 0.002)**

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.007	0.006	0.005	0.005	0.005	0.007	0.006	0.005	0.005	0.005
2nd Year						0.009	0.008	0.007	0.006	0.006	0.009	0.008	0.007	0.006	0.006
3rd Year						0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.008	0.007	0.007
4th Year	0.015	0.013	0.012	0.011	0.010	0.010	0.009	0.008	0.008	0.007	0.011	0.010	0.009	0.008	0.008
5th Year	0.017	0.015	0.014	0.013	0.012	0.010	0.009	0.009	0.008	0.008	0.012	0.010	0.010	0.009	0.009
6th Year	0.018	0.016	0.014	0.013	0.012	0.011	0.010	0.009	0.008	0.008	0.012	0.011	0.010	0.009	0.009
Geo p.a.e.	0.017	0.015	0.013	0.012	0.011	0.009	0.008	0.007	0.007	0.007	0.010	0.009	0.008	0.007	0.007
Rel p.a.e.	0.017	0.015	0.013	0.012	0.012	0.009	0.008	0.008	0.007	0.007	0.010	0.009	0.008	0.007	0.007

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.007	0.006	0.005	0.005	0.005	0.007	0.006	0.005	0.005	0.005
2nd Year						0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.006	0.005	0.005
3rd Year						0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.006	0.005	0.005
4th Year	0.015	0.013	0.012	0.011	0.010	0.007	0.007	0.006	0.006	0.005	0.009	0.008	0.007	0.007	0.006
5th Year	0.015	0.013	0.012	0.011	0.010	0.008	0.007	0.006	0.006	0.006	0.009	0.008	0.008	0.007	0.007
6th Year	0.016	0.014	0.012	0.011	0.010	0.008	0.007	0.006	0.006	0.006	0.010	0.008	0.008	0.007	0.007
Geo p.a.e.	0.015	0.013	0.012	0.011	0.010	0.007	0.006	0.006	0.005	0.005	0.008	0.007	0.006	0.006	0.006
Rel p.a.e.	0.016	0.014	0.012	0.011	0.010	0.007	0.007	0.006	0.006	0.005	0.008	0.007	0.007	0.006	0.006

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Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.929, Estim Std Dev = 0.256, Avg D = 0.016)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.014	0.012	0.011	0.010	0.009	0.014	0.012	0.011	0.010	0.009
2nd Year						0.027	0.025	0.024	0.023	0.022	0.027	0.025	0.024	0.023	0.022
3rd Year						0.032	0.031	0.029	0.028	0.028	0.032	0.031	0.029	0.028	0.028
4th Year	0.032	0.027	0.024	0.022	0.021	0.037	0.035	0.033	0.032	0.032	0.036	0.034	0.032	0.031	0.030
5th Year	0.045	0.040	0.037	0.035	0.034	0.040	0.038	0.037	0.036	0.035	0.041	0.039	0.037	0.036	0.035
6th Year	0.050	0.046	0.043	0.041	0.039	0.043	0.041	0.040	0.039	0.038	0.044	0.042	0.040	0.039	0.038
Geo p.a.e.	0.041	0.037	0.034	0.032	0.030	0.030	0.028	0.027	0.026	0.025	0.030	0.028	0.027	0.026	0.025
Rel p.a.e.	0.044	0.040	0.037	0.034	0.032	0.033	0.030	0.029	0.028	0.027	0.033	0.030	0.029	0.028	0.027

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	42	56	70	84	98	210	280	350	420	490					
1st Year						0.014	0.012	0.011	0.010	0.009	0.014	0.012	0.011	0.010	0.009
2nd Year						0.019	0.018	0.017	0.016	0.016	0.019	0.018	0.017	0.016	0.016
3rd Year						0.023	0.022	0.021	0.021	0.021	0.023	0.022	0.021	0.021	0.021
4th Year	0.032	0.027	0.024	0.022	0.021	0.027	0.026	0.025	0.025	0.024	0.027	0.026	0.025	0.024	0.024
5th Year	0.034	0.030	0.028	0.026	0.024	0.030	0.029	0.028	0.028	0.028	0.030	0.029	0.028	0.027	0.027
6th Year	0.037	0.033	0.031	0.029	0.028	0.032	0.031	0.031	0.031	0.030	0.033	0.032	0.031	0.030	0.030
Geo p.a.e.	0.034	0.030	0.027	0.026	0.024	0.023	0.022	0.021	0.020	0.020	0.024	0.022	0.021	0.020	0.020
Rel p.a.e.	0.037	0.032	0.030	0.028	0.026	0.025	0.024	0.023	0.022	0.021	0.025	0.024	0.023	0.022	0.021

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Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] (Pooled Mean = 0.404, Estim Std Dev = 0.491, Avg D = 0.001)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	252	336	420	504	588	1,260	1,680	2,100	2,520	2,940					
1st Year						0.011	0.010	0.009	0.008	0.007	0.011	0.010	0.009	0.008	0.007
2nd Year						0.012	0.011	0.010	0.009	0.008	0.012	0.011	0.010	0.009	0.008
3rd Year						0.013	0.011	0.010	0.009	0.009	0.013	0.011	0.010	0.009	0.009
4th Year	0.025	0.021	0.019	0.017	0.016	0.013	0.011	0.010	0.010	0.009	0.015	0.014	0.012	0.011	0.011
5th Year	0.026	0.022	0.020	0.019	0.017	0.013	0.012	0.011	0.010	0.009	0.016	0.014	0.013	0.012	0.011
6th Year	0.026	0.023	0.021	0.019	0.018	0.013	0.012	0.011	0.010	0.010	0.016	0.014	0.013	0.012	0.011
Geo p.a.e.	0.026	0.022	0.020	0.018	0.017	0.012	0.011	0.010	0.009	0.009	0.014	0.012	0.011	0.010	0.009
Rel p.a.e.	0.063	0.055	0.049	0.045	0.042	0.031	0.027	0.025	0.023	0.021	0.034	0.030	0.027	0.025	0.023

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	252	336	420	504	588	1,260	1,680	2,100	2,520	2,940					
1st Year						0.011	0.010	0.009	0.008	0.007	0.011	0.010	0.009	0.008	0.007
2nd Year						0.011	0.010	0.009	0.008	0.007	0.011	0.010	0.009	0.008	0.007
3rd Year						0.011	0.010	0.009	0.008	0.007	0.011	0.010	0.009	0.008	0.007
4th Year	0.025	0.021	0.019	0.017	0.016	0.011	0.010	0.009	0.008	0.007	0.014	0.012	0.011	0.010	0.009
5th Year	0.025	0.021	0.019	0.018	0.016	0.011	0.010	0.009	0.008	0.008	0.014	0.013	0.011	0.010	0.010
6th Year	0.025	0.021	0.019	0.018	0.016	0.011	0.010	0.009	0.008	0.008	0.014	0.013	0.011	0.010	0.010
Geo p.a.e.	0.025	0.021	0.019	0.018	0.016	0.011	0.010	0.009	0.008	0.007	0.013	0.011	0.010	0.009	0.008
Rel p.a.e.	0.061	0.053	0.048	0.043	0.040	0.028	0.024	0.022	0.020	0.018	0.031	0.027	0.024	0.022	0.021

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #11A - % of full time teachers newly hired and who were first time teachers. (public schools)

[Model 3A] **(Pooled Mean = 0.043, Estim Std Dev = 0.203, Avg D = 0.001)**

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	252	336	420	504	588	1,260	1,680	2,100	2,520	2,940					
1st Year						0.005	0.004	0.004	0.003	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year						0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
3rd Year						0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
4th Year	0.010	0.009	0.008	0.007	0.007	0.006	0.005	0.005	0.004	0.004	0.007	0.006	0.005	0.005	0.005
5th Year	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.005	0.005	0.004	0.007	0.006	0.006	0.005	0.005
6th Year	0.011	0.010	0.009	0.008	0.008	0.006	0.005	0.005	0.005	0.004	0.007	0.006	0.006	0.005	0.005
Geo p.a.e.	0.011	0.009	0.008	0.008	0.007	0.005	0.005	0.004	0.004	0.004	0.006	0.005	0.005	0.004	0.004
Rel p.a.e.	0.249	0.218	0.196	0.180	0.167	0.127	0.112	0.103	0.095	0.090	0.138	0.121	0.110	0.102	0.096

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	252	336	420	504	588	1,260	1,680	2,100	2,520	2,940					
1st Year						0.005	0.004	0.004	0.003	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year						0.005	0.004	0.004	0.003	0.003	0.005	0.004	0.004	0.003	0.003
3rd Year						0.005	0.004	0.004	0.003	0.003	0.005	0.004	0.004	0.003	0.003
4th Year	0.010	0.009	0.008	0.007	0.007	0.005	0.004	0.004	0.003	0.003	0.006	0.005	0.005	0.004	0.004
5th Year	0.010	0.009	0.008	0.007	0.007	0.005	0.004	0.004	0.003	0.003	0.006	0.005	0.005	0.004	0.004
6th Year	0.010	0.009	0.008	0.007	0.007	0.005	0.004	0.004	0.004	0.003	0.006	0.005	0.005	0.004	0.004
Geo p.a.e.	0.010	0.009	0.008	0.007	0.007	0.005	0.004	0.004	0.003	0.003	0.005	0.005	0.004	0.004	0.004
Rel p.a.e.	0.238	0.206	0.185	0.169	0.156	0.109	0.095	0.086	0.079	0.073	0.123	0.107	0.096	0.088	0.082

SASS Results, Estimates, Projected Absolute Errors (Iowa) Public Schools
Alternating Large-and-Small-Sample Design: Interleaved 3-6-9
under Models 3A and 4M

[SASS Results]

Item	Source	1987 - 88				1990 - 91				1993 - 94			
		N*	N	Mean	Std Dev	N*	N	Mean	Std Dev	N*	N	Mean	Std Dev
#1	School (Pub)	152	92	41.292	32.312	177	99	39.337	32.632	158	85	43.091	29.685
#4	School (Pub)	152	152	1.832	2.021	177	177	2.062	2.156				
#6	Adminr (Pub & Pri)	189	189	0.008	0.087	208	208	0.026	0.159	189	189	0.016	0.126
#7A	School (Pub)	152	152	15.107	3.593	177	177	14.334	3.662	158	156	14.689	3.325
#7B	School (Pri)												
#8A	School (Pub)	152	152	1.000	0.000	177	177	0.984	0.124	158	158	0.996	0.060
#8B	School (Pri)												
#9	Adminr (Pub)	151	151	0.993	0.081	177	177	0.990	0.099	163	163	0.981	0.136
#10A	Teacher (Pub)	N/A	N/A	N/A	N/A	941	941	0.479	0.500	906	906	0.420	0.494
#10B	Teacher (Pri)												
#11A	Teacher (Pub)	N/A	N/A	N/A	N/A	941	941	0.021	0.144	906	906	0.025	0.155
#11B	Teacher (Pri)												

* denotes actual sample size.

[Estimates]

Item	Source	Pooled Mean	Estim Std Dev	Avg D	Ref N
#1	School (Pub)	41.240	31.571	0.951	160
#4	School (Pub)	1.947	2.090	0.077	160
#6	Adminr (Pub & Pri)	0.017	0.127	0.005	200
#7A	School (Pub)	14.710	3.530	0.188	160
#7B	School (Pri)				
#8A	School (Pub)	0.994	0.080	0.005	160
#8B	School (Pri)				
#9	Adminr (Pub)	0.988	0.108	0.002	160
#10A	Teacher (Pub)	0.449	0.497	0.020	900
#10B	Teacher (Pri)				
#11A	Teacher (Pub)	0.023	0.150	0.001	900
#11B	Teacher (Pri)				

State composite (IA)

[Projected] **[Interleaved 3-6-9]**

Item	Rel p.a.e. Mod 3A Cost Ratio			Rel p.a.e. Mod 4M Cost Ratio		
	0.3	0.5	0.7	0.3	0.5	0.7
#1	0.092	0.076	0.067	0.076	0.061	0.053
#4	0.135	0.113	0.101	0.109	0.089	0.078
#6	0.892	0.748	0.671	0.711	0.584	0.519
#7A	0.034	0.029	0.026	0.026	0.022	0.020
#7B						
#8A	0.012	0.010	0.009	0.009	0.008	0.007
#8B						
#9	0.012	0.010	0.009	0.010	0.008	0.007
#10A	0.082	0.072	0.067	0.063	0.056	0.053
#10B						
#11A	0.300	0.242	0.212	0.261	0.205	0.176
#11B						
Avg	0.077	0.065	0.058	0.063	0.052	0.046

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 3A] (Pooled Mean = 41.240, Estim Std Dev = 31.571, Avg D = 0.951)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						2.578	2.232	1.997	1.823	1.688	2.578	2.232	1.997	1.823	1.688
2nd Year						3.339	2.994	2.758	2.584	2.449	3.339	2.994	2.758	2.584	2.449
3rd Year						3.654	3.309	3.073	2.899	2.764	3.654	3.309	3.073	2.899	2.764
4th Year	5.764	4.992	4.465	4.076	3.773	3.896	3.551	3.315	3.141	3.006	4.265	3.829	3.533	3.315	3.147
5th Year	6.525	5.753	5.226	4.837	4.535	4.100	3.755	3.519	3.345	3.210	4.594	4.155	3.856	3.636	3.466
6th Year	6.841	6.068	5.541	5.152	4.850	4.280	3.934	3.699	3.525	3.390	4.802	4.363	4.064	3.844	3.674
Geo p.a.e.	6.360	5.586	5.057	4.666	4.362	3.593	3.241	3.001	2.823	2.684	3.789	3.396	3.128	2.930	2.776
Rel p.a.e.	0.154	0.135	0.123	0.113	0.106	0.087	0.079	0.073	0.068	0.065	0.092	0.082	0.076	0.071	0.067

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						2.578	2.232	1.997	1.823	1.688	2.578	2.232	1.997	1.823	1.688
2nd Year						2.688	2.359	2.137	1.975	1.851	2.688	2.359	2.137	1.975	1.851
3rd Year						2.793	2.478	2.268	2.117	2.002	2.793	2.478	2.268	2.117	2.002
4th Year	5.764	4.992	4.465	4.076	3.773	2.895	2.593	2.393	2.250	2.141	3.539	3.123	2.845	2.643	2.489
5th Year	5.814	5.050	4.529	4.146	3.849	2.994	2.702	2.511	2.375	2.273	3.620	3.215	2.945	2.750	2.603
6th Year	5.864	5.107	4.593	4.216	3.924	3.089	2.807	2.624	2.494	2.397	3.699	3.304	3.042	2.854	2.712
Geo p.a.e.	5.814	5.049	4.529	4.145	3.848	2.834	2.521	2.312	2.160	2.044	3.117	2.750	2.504	2.325	2.188
Rel p.a.e.	0.141	0.122	0.110	0.101	0.093	0.069	0.061	0.056	0.052	0.050	0.076	0.067	0.061	0.056	0.053

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] (Pooled Mean = 1.947, Estim Std Dev = 2.090, Avg D = 0.077)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.171	0.148	0.132	0.121	0.112	0.171	0.148	0.132	0.121	0.112
2nd Year						0.232	0.209	0.194	0.182	0.173	0.232	0.209	0.194	0.182	0.173
3rd Year						0.258	0.235	0.219	0.208	0.199	0.258	0.235	0.219	0.208	0.199
4th Year	0.382	0.330	0.296	0.270	0.250	0.277	0.254	0.239	0.227	0.218	0.297	0.268	0.249	0.235	0.224
5th Year	0.443	0.392	0.357	0.331	0.311	0.294	0.271	0.255	0.244	0.235	0.323	0.294	0.275	0.260	0.249
6th Year	0.468	0.417	0.382	0.357	0.337	0.308	0.285	0.270	0.258	0.249	0.340	0.311	0.291	0.277	0.266
Geo p.a.e.	0.429	0.378	0.343	0.317	0.297	0.252	0.229	0.212	0.201	0.191	0.263	0.237	0.219	0.206	0.196
Rel p.a.e.	0.221	0.194	0.176	0.163	0.153	0.129	0.117	0.109	0.103	0.098	0.135	0.122	0.113	0.106	0.101

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.171	0.148	0.132	0.121	0.112	0.171	0.148	0.132	0.121	0.112
2nd Year						0.181	0.160	0.146	0.135	0.127	0.181	0.160	0.146	0.135	0.127
3rd Year						0.191	0.171	0.158	0.149	0.142	0.191	0.171	0.158	0.149	0.142
4th Year	0.382	0.330	0.296	0.270	0.250	0.201	0.182	0.170	0.161	0.154	0.241	0.214	0.196	0.184	0.174
5th Year	0.386	0.336	0.302	0.277	0.257	0.210	0.192	0.180	0.172	0.166	0.248	0.223	0.206	0.194	0.184
6th Year	0.391	0.342	0.308	0.283	0.264	0.219	0.202	0.191	0.183	0.177	0.256	0.231	0.215	0.203	0.194
Geo p.a.e.	0.386	0.336	0.302	0.277	0.257	0.195	0.175	0.162	0.152	0.145	0.212	0.188	0.173	0.161	0.152
Rel p.a.e.	0.198	0.173	0.155	0.142	0.132	0.100	0.090	0.083	0.078	0.074	0.109	0.097	0.089	0.083	0.078

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] **(Pooled Mean = 0.017, Estim Std Dev = 0.127, Avg D = 0.005)**

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	24	32	40	48	56	120	160	200	240	280					
1st Year						0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
2nd Year						0.013	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.010	0.010
3rd Year						0.015	0.013	0.012	0.012	0.011	0.015	0.013	0.012	0.012	0.011
4th Year	0.021	0.018	0.016	0.015	0.014	0.016	0.014	0.014	0.013	0.013	0.017	0.015	0.014	0.013	0.013
5th Year	0.025	0.022	0.020	0.018	0.017	0.017	0.015	0.015	0.014	0.014	0.018	0.017	0.016	0.015	0.014
6th Year	0.026	0.023	0.021	0.020	0.019	0.018	0.016	0.016	0.015	0.014	0.019	0.018	0.017	0.016	0.015
Geo p.a.e.	0.024	0.021	0.019	0.018	0.016	0.014	0.013	0.012	0.011	0.011	0.015	0.013	0.012	0.012	0.011
Rel p.a.e.	1.432	1.262	1.147	1.061	0.994	0.858	0.781	0.728	0.688	0.657	0.892	0.807	0.748	0.705	0.671

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	24	32	40	48	56	120	160	200	240	280					
1st Year						0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
2nd Year						0.010	0.009	0.008	0.008	0.007	0.010	0.009	0.008	0.008	0.007
3rd Year						0.011	0.010	0.009	0.008	0.008	0.011	0.010	0.009	0.008	0.008
4th Year	0.021	0.018	0.016	0.015	0.014	0.011	0.010	0.010	0.009	0.009	0.013	0.012	0.011	0.010	0.010
5th Year	0.021	0.018	0.017	0.015	0.014	0.012	0.011	0.010	0.010	0.010	0.014	0.013	0.012	0.011	0.010
6th Year	0.021	0.019	0.017	0.016	0.015	0.012	0.012	0.011	0.011	0.010	0.014	0.013	0.012	0.012	0.011
Geo p.a.e.	0.021	0.018	0.017	0.015	0.014	0.011	0.010	0.009	0.009	0.008	0.012	0.011	0.010	0.009	0.009
Rel p.a.e.	1.277	1.111	0.999	0.916	0.852	0.659	0.594	0.551	0.520	0.496	0.711	0.635	0.584	0.547	0.519

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 14.710, Estim Std Dev = 3.530, Avg D = 0.188)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.288	0.250	0.223	0.204	0.189	0.288	0.250	0.223	0.204	0.189
2nd Year						0.439	0.400	0.374	0.354	0.339	0.439	0.400	0.374	0.354	0.339
3rd Year						0.501	0.462	0.436	0.417	0.401	0.501	0.462	0.436	0.417	0.401
4th Year	0.644	0.558	0.499	0.456	0.422	0.549	0.510	0.484	0.464	0.449	0.566	0.518	0.486	0.463	0.445
5th Year	0.795	0.709	0.650	0.606	0.572	0.589	0.550	0.524	0.505	0.490	0.628	0.580	0.547	0.523	0.504
6th Year	0.857	0.771	0.712	0.668	0.635	0.625	0.586	0.560	0.540	0.525	0.669	0.621	0.588	0.564	0.545
Geo p.a.e.	0.760	0.673	0.613	0.569	0.535	0.484	0.443	0.416	0.395	0.379	0.497	0.453	0.423	0.400	0.383
Rel p.a.e.	0.052	0.046	0.042	0.039	0.036	0.033	0.030	0.028	0.027	0.026	0.034	0.031	0.029	0.027	0.026

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.288	0.250	0.223	0.204	0.189	0.288	0.250	0.223	0.204	0.189
2nd Year						0.325	0.291	0.269	0.253	0.241	0.325	0.291	0.269	0.253	0.241
3rd Year						0.358	0.328	0.308	0.295	0.284	0.358	0.328	0.308	0.295	0.284
4th Year	0.644	0.558	0.499	0.456	0.422	0.389	0.361	0.343	0.331	0.322	0.442	0.401	0.374	0.355	0.340
5th Year	0.662	0.578	0.521	0.480	0.448	0.417	0.391	0.375	0.363	0.355	0.467	0.428	0.403	0.385	0.372
6th Year	0.679	0.597	0.543	0.503	0.473	0.443	0.419	0.404	0.393	0.386	0.490	0.454	0.430	0.414	0.401
Geo p.a.e.	0.661	0.578	0.521	0.479	0.447	0.366	0.335	0.314	0.299	0.288	0.388	0.350	0.326	0.308	0.295
Rel p.a.e.	0.045	0.039	0.035	0.033	0.030	0.025	0.023	0.021	0.020	0.020	0.026	0.024	0.022	0.021	0.020

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #8A - Percentage of schools in which various programs and services were available. (public schools)

[Model 3A] (Pooled Mean = 0.994, Estim Std Dev = 0.080, Avg D = 0.005)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.007	0.006	0.005	0.005	0.004	0.007	0.006	0.005	0.005	0.004
2nd Year						0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008
3rd Year						0.012	0.011	0.010	0.010	0.009	0.012	0.011	0.010	0.010	0.009
4th Year	0.015	0.013	0.011	0.010	0.010	0.013	0.012	0.011	0.011	0.011	0.013	0.012	0.011	0.011	0.010
5th Year	0.018	0.016	0.015	0.014	0.013	0.014	0.013	0.012	0.012	0.012	0.015	0.014	0.013	0.012	0.012
6th Year	0.020	0.018	0.017	0.016	0.015	0.015	0.014	0.013	0.013	0.013	0.016	0.015	0.014	0.013	0.013
Geo p.a.e.	0.017	0.015	0.014	0.013	0.012	0.011	0.010	0.010	0.009	0.009	0.012	0.011	0.010	0.009	0.009
Rel p.a.e.	0.018	0.016	0.014	0.013	0.012	0.011	0.010	0.010	0.009	0.009	0.012	0.011	0.010	0.009	0.009

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.007	0.006	0.005	0.005	0.004	0.007	0.006	0.005	0.005	0.004
2nd Year						0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.006	0.006	0.006
3rd Year						0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.007
4th Year	0.015	0.013	0.011	0.010	0.010	0.009	0.009	0.008	0.008	0.008	0.010	0.009	0.009	0.008	0.008
5th Year	0.015	0.013	0.012	0.011	0.010	0.010	0.009	0.009	0.009	0.009	0.011	0.010	0.010	0.009	0.009
6th Year	0.015	0.014	0.012	0.012	0.011	0.011	0.010	0.010	0.009	0.009	0.012	0.011	0.010	0.010	0.010
Geo p.a.e.	0.015	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.007	0.007	0.009	0.008	0.008	0.007	0.007
Rel p.a.e.	0.015	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.007	0.007	0.009	0.008	0.008	0.007	0.007

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.988, Estim Std Dev = 0.108, Avg D = 0.002)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.009	0.008	0.007	0.006	0.006	0.009	0.008	0.007	0.006	0.006
2nd Year						0.010	0.009	0.008	0.008	0.007	0.010	0.009	0.008	0.008	0.007
3rd Year						0.011	0.010	0.009	0.009	0.008	0.011	0.010	0.009	0.009	0.008
4th Year	0.020	0.017	0.015	0.014	0.013	0.012	0.010	0.010	0.009	0.009	0.013	0.012	0.011	0.010	0.009
5th Year	0.021	0.019	0.017	0.016	0.015	0.012	0.011	0.010	0.010	0.009	0.014	0.013	0.012	0.011	0.010
6th Year	0.022	0.019	0.018	0.016	0.015	0.013	0.011	0.011	0.010	0.009	0.015	0.013	0.012	0.011	0.011
Geo p.a.e.	0.021	0.018	0.017	0.015	0.014	0.011	0.010	0.009	0.008	0.008	0.012	0.011	0.010	0.009	0.008
Rel p.a.e.	0.021	0.019	0.017	0.015	0.014	0.011	0.010	0.009	0.009	0.008	0.012	0.011	0.010	0.009	0.009

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	19	26	32	38	45	96	128	160	192	224					
1st Year						0.009	0.008	0.007	0.006	0.006	0.009	0.008	0.007	0.006	0.006
2nd Year						0.009	0.008	0.007	0.006	0.006	0.009	0.008	0.007	0.006	0.006
3rd Year						0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
4th Year	0.020	0.017	0.015	0.014	0.013	0.009	0.008	0.007	0.007	0.006	0.012	0.010	0.009	0.008	0.008
5th Year	0.020	0.017	0.015	0.014	0.013	0.009	0.008	0.008	0.007	0.007	0.012	0.010	0.009	0.009	0.008
6th Year	0.020	0.017	0.015	0.014	0.013	0.010	0.008	0.008	0.007	0.007	0.012	0.010	0.009	0.009	0.008
Geo p.a.e.	0.020	0.017	0.015	0.014	0.013	0.009	0.008	0.007	0.007	0.006	0.010	0.009	0.008	0.007	0.007
Rel p.a.e.	0.020	0.017	0.016	0.014	0.013	0.009	0.008	0.007	0.007	0.006	0.010	0.009	0.008	0.008	0.007

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] (Pooled Mean = 0.449, Estim Std Dev = 0.497, Avg D = 0.020)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	108	144	180	216	252	540	720	900	1,080	1,260					
1st Year						0.017	0.015	0.013	0.012	0.011	0.017	0.015	0.013	0.012	0.011
2nd Year						0.033	0.030	0.029	0.028	0.027	0.033	0.030	0.029	0.028	0.027
3rd Year						0.039	0.037	0.035	0.034	0.033	0.039	0.037	0.035	0.034	0.033
4th Year	0.038	0.033	0.030	0.027	0.025	0.044	0.042	0.040	0.039	0.038	0.043	0.041	0.039	0.037	0.036
5th Year	0.054	0.049	0.045	0.043	0.041	0.048	0.046	0.045	0.043	0.043	0.049	0.047	0.045	0.043	0.042
6th Year	0.060	0.055	0.052	0.049	0.047	0.052	0.050	0.048	0.047	0.046	0.054	0.051	0.049	0.047	0.046
Geo p.a.e.	0.050	0.045	0.041	0.038	0.036	0.037	0.034	0.032	0.031	0.030	0.037	0.034	0.032	0.031	0.030
Rel p.a.e.	0.111	0.099	0.091	0.086	0.081	0.082	0.076	0.072	0.069	0.067	0.082	0.076	0.072	0.069	0.067

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	108	144	180	216	252	540	720	900	1,080	1,260					
1st Year						0.017	0.015	0.013	0.012	0.011	0.017	0.015	0.013	0.012	0.011
2nd Year						0.023	0.022	0.021	0.020	0.019	0.023	0.022	0.021	0.020	0.019
3rd Year						0.028	0.027	0.026	0.025	0.025	0.028	0.027	0.026	0.025	0.025
4th Year	0.038	0.033	0.030	0.027	0.025	0.032	0.031	0.030	0.030	0.029	0.033	0.031	0.030	0.029	0.029
5th Year	0.041	0.037	0.033	0.031	0.030	0.036	0.035	0.034	0.034	0.033	0.037	0.035	0.034	0.033	0.033
6th Year	0.044	0.040	0.037	0.035	0.033	0.039	0.038	0.037	0.037	0.037	0.040	0.038	0.037	0.037	0.036
Geo p.a.e.	0.041	0.036	0.033	0.031	0.029	0.028	0.026	0.025	0.025	0.024	0.029	0.027	0.025	0.024	0.024
Rel p.a.e.	0.092	0.081	0.074	0.069	0.065	0.063	0.059	0.057	0.055	0.053	0.063	0.059	0.056	0.054	0.053

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #11A - % of full time teachers newly hired and who were first time teachers. (public schools)

[Model 3A] (Pooled Mean = 0.023, Estim Std Dev = 0.150, Avg D = 0.001)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	108	144	180	216	252	540	720	900	1,080	1,260					
1st Year						0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.004	0.003
2nd Year						0.006	0.005	0.005	0.005	0.004	0.006	0.005	0.005	0.005	0.004
3rd Year						0.006	0.006	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005
4th Year	0.012	0.010	0.009	0.008	0.008	0.007	0.006	0.006	0.005	0.005	0.008	0.007	0.006	0.006	0.005
5th Year	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.006	0.005	0.005	0.008	0.007	0.007	0.006	0.006
6th Year	0.013	0.011	0.010	0.009	0.009	0.007	0.007	0.006	0.006	0.005	0.008	0.008	0.007	0.006	0.006
Geo p.a.e.	0.012	0.011	0.010	0.009	0.008	0.006	0.006	0.005	0.005	0.005	0.007	0.006	0.006	0.005	0.005
Rel p.a.e.	0.533	0.466	0.420	0.386	0.359	0.278	0.248	0.227	0.212	0.200	0.300	0.266	0.242	0.225	0.212

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	108	144	180	216	252	540	720	900	1,080	1,260					
1st Year						0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.004	0.003
2nd Year						0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
3rd Year						0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004
4th Year	0.012	0.010	0.009	0.008	0.008	0.005	0.005	0.004	0.004	0.004	0.007	0.006	0.005	0.005	0.005
5th Year	0.012	0.010	0.009	0.008	0.008	0.005	0.005	0.004	0.004	0.004	0.007	0.006	0.005	0.005	0.005
6th Year	0.012	0.010	0.009	0.008	0.008	0.006	0.005	0.004	0.004	0.004	0.007	0.006	0.006	0.005	0.005
Geo p.a.e.	0.012	0.010	0.009	0.008	0.008	0.005	0.005	0.004	0.004	0.004	0.006	0.005	0.005	0.004	0.004
Rel p.a.e.	0.503	0.436	0.390	0.357	0.331	0.233	0.204	0.184	0.170	0.159	0.261	0.228	0.205	0.189	0.176

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SASS Results, Estimates, and Projected Absolute Errors (New York) Public Schools
Alternating Large-and-Small-Sample Design: Interleaved 3-6-9
under Models 3A and 4M

[SASS Results]

Item	Source	1987 - 88				1990 - 91				1993 - 94			
		N*	N	Mean	Std Dev	N*	N	Mean	Std Dev	N*	N	Mean	Std Dev
#1	School (Pub)	400	268	109.738	145.476	243	193	120.575	151.853	269	190	175.756	239.496
#4	School (Pub)	400	400	4.231	6.166	243	243	3.556	3.930				
#6	Adminr (Pub & Pri)	642	642	0.075	0.264	498	498	0.055	0.229	551	551	0.103	0.304
#7A	School (Pub)	400	400	15.183	4.393	243	235	14.436	4.230	269	249	15.028	3.219
#7B	School (Pri)												
#8A	School (Pub)	400	400	0.992	0.091	243	243	1.000	0.000	269	269	1.000	0.000
#8B	School (Pri)												
#9	Adminr (Pub)	415	415	0.964	0.185	248	248	0.976	0.152	280	280	0.991	0.093
#10A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,173	1,173	0.423	0.494	1,459	1,459	0.403	0.491
#10B	Teacher (Pri)												
#11A	Teacher (Pub)	N/A	N/A	N/A	N/A	1,173	1,173	0.013	0.111	1,459	1,459	0.030	0.171
#11B	Teacher (Pri)												

* denotes actual sample size.

[Estimates]

Item	Source	Pooled Mean	Estim Std Dev	Avg D	Ref N
#1	School (Pub)	135.356	184.012	11.003	270
#4	School (Pub)	3.893	5.170	0.225	270
#6	Adminr (Pub & Pri)	0.078	0.267	0.011	550
#7A	School (Pub)	14.882	3.981	0.223	270
#7B	School (Pri)				
#8A	School (Pub)	0.997	0.052	0.001	270
#8B	School (Pri)				
#9	Adminr (Pub)	0.977	0.148	0.004	270
#10A	Teacher (Pub)	0.413	0.492	0.006	1,460
#10B	Teacher (Pri)				
#11A	Teacher (Pub)	0.021	0.144	0.006	1,460
#11B	Teacher (Pri)				

State composite (NY)

[Projected] **[Interleaved 3-6-9]**

Item	Rel p.a.e. Mod 3A Cost Ratio			Rel p.a.e. Mod 4M Cost Ratio		
	0.3	0.5	0.7	0.3	0.5	0.7
#1	0.170	0.148	0.135	0.131	0.114	0.106
#4	0.147	0.125	0.114	0.114	0.097	0.088
#6	0.301	0.261	0.240	0.232	0.202	0.188
#7A	0.033	0.028	0.026	0.025	0.022	0.020
#7B						
#8A	0.005	0.004	0.004	0.004	0.003	0.003
#8B						
#9	0.015	0.013	0.011	0.012	0.010	0.009
#10A	0.051	0.042	0.038	0.041	0.033	0.029
#10B						
#11A	0.451	0.402	0.374	0.354	0.323	0.307
#11B						
Avg	0.067	0.058	0.052	0.053	0.045	0.041

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #1 - Number of students served by chapter 1 services. (public schools)

[Model 3A] (Pooled Mean = 135.356, Estim Std Dev = 184.012, Avg D = 11.003)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						11.566	10.016	8.959	8.178	7.572	11.566	10.016	8.959	8.178	7.572
2nd Year						20.368	18.819	17.761	16.981	16.374	20.368	18.819	17.761	16.981	16.374
3rd Year						24.014	22.465	21.407	20.627	20.020	24.014	22.465	21.407	20.627	20.020
4th Year	25.862	22.397	20.033	18.287	16.931	26.812	25.263	24.205	23.424	22.818	26.656	24.808	23.561	22.649	21.947
5th Year	34.664	31.200	28.835	27.090	25.733	29.171	27.621	26.564	25.783	25.176	30.156	28.249	26.956	26.005	25.270
6th Year	38.311	34.846	32.481	30.736	29.379	31.249	29.699	28.642	27.861	27.254	32.532	30.617	29.316	28.360	27.620
Geo p.a.e.	32.505	28.984	26.572	24.786	23.392	22.740	21.080	19.933	19.077	18.404	22.998	21.203	19.970	19.054	18.337
Rel p.a.e.	0.240	0.214	0.196	0.183	0.173	0.168	0.156	0.147	0.141	0.136	0.170	0.157	0.148	0.141	0.135

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						11.566	10.016	8.959	8.178	7.572	11.566	10.016	8.959	8.178	7.572
2nd Year						14.534	13.335	12.560	12.015	11.611	14.534	13.335	12.560	12.015	11.611
3rd Year						16.992	15.978	15.337	14.895	14.570	16.992	15.978	15.337	14.895	14.570
4th Year	25.862	22.397	20.033	18.287	16.931	19.137	18.242	17.684	17.301	17.023	20.412	18.998	18.096	17.469	17.007
5th Year	27.319	24.065	21.881	20.295	19.082	21.064	20.255	19.753	19.412	19.164	22.229	20.938	20.124	19.562	19.150
6th Year	28.702	25.624	23.585	22.122	21.015	22.829	22.085	21.626	21.314	21.089	23.909	22.713	21.964	21.451	21.076
Geo p.a.e.	27.270	23.993	21.785	20.174	18.935	17.243	16.100	15.341	14.792	14.372	17.723	16.375	15.488	14.851	14.367
Rel p.a.e.	0.201	0.177	0.161	0.149	0.140	0.127	0.119	0.113	0.109	0.106	0.131	0.121	0.114	0.110	0.106

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #4 - Number of K-12 teachers that are new to the school this year. (public schools)

[Model 3A] (Pooled Mean = 3.893, Estim Std Dev = 5.170, Avg D = 0.225)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.325	0.281	0.252	0.230	0.213	0.325	0.281	0.252	0.230	0.213
2nd Year						0.505	0.461	0.432	0.410	0.393	0.505	0.461	0.432	0.410	0.393
3rd Year						0.579	0.536	0.506	0.484	0.467	0.579	0.536	0.506	0.484	0.467
4th Year	0.727	0.629	0.563	0.514	0.476	0.637	0.593	0.563	0.541	0.524	0.652	0.599	0.563	0.537	0.517
5th Year	0.907	0.809	0.743	0.694	0.656	0.685	0.641	0.612	0.590	0.573	0.726	0.672	0.635	0.608	0.587
6th Year	0.981	0.884	0.817	0.768	0.730	0.727	0.684	0.654	0.632	0.615	0.775	0.721	0.684	0.657	0.636
Geo p.a.e.	0.865	0.766	0.699	0.649	0.611	0.558	0.512	0.481	0.458	0.439	0.572	0.522	0.488	0.462	0.443
Rel p.a.e.	0.222	0.197	0.180	0.167	0.157	0.143	0.132	0.124	0.118	0.113	0.147	0.134	0.125	0.119	0.114

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.325	0.281	0.252	0.230	0.213	0.325	0.281	0.252	0.230	0.213
2nd Year						0.371	0.334	0.309	0.292	0.279	0.371	0.334	0.309	0.292	0.279
3rd Year						0.413	0.379	0.358	0.343	0.332	0.413	0.379	0.358	0.343	0.332
4th Year	0.727	0.629	0.563	0.514	0.476	0.450	0.420	0.401	0.387	0.377	0.507	0.461	0.432	0.411	0.395
5th Year	0.749	0.654	0.591	0.544	0.509	0.485	0.457	0.439	0.427	0.418	0.538	0.495	0.468	0.449	0.434
6th Year	0.770	0.679	0.618	0.573	0.539	0.517	0.491	0.475	0.463	0.455	0.567	0.527	0.501	0.483	0.470
Geo p.a.e.	0.748	0.654	0.590	0.543	0.507	0.422	0.387	0.364	0.347	0.335	0.444	0.403	0.376	0.356	0.342
Rel p.a.e.	0.192	0.168	0.152	0.140	0.130	0.108	0.099	0.094	0.089	0.086	0.114	0.104	0.097	0.092	0.088

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Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #6 - Percentage of all schools with minority principals. (public and private schools)

[Model 3A] (Pooled Mean = 0.078, Estim Std Dev = 0.267, Avg D = 0.011)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	66	88	110	132	154	330	440	550	660	770					
1st Year						0.012	0.010	0.009	0.008	0.008	0.012	0.010	0.009	0.008	0.008
2nd Year						0.021	0.019	0.018	0.017	0.017	0.021	0.019	0.018	0.017	0.017
3rd Year						0.024	0.023	0.022	0.021	0.020	0.024	0.023	0.022	0.021	0.020
4th Year	0.026	0.023	0.020	0.019	0.017	0.027	0.026	0.025	0.024	0.023	0.027	0.025	0.024	0.023	0.022
5th Year	0.035	0.032	0.029	0.028	0.026	0.030	0.028	0.027	0.026	0.026	0.031	0.029	0.027	0.026	0.026
6th Year	0.039	0.035	0.033	0.031	0.030	0.032	0.030	0.029	0.028	0.028	0.033	0.031	0.030	0.029	0.028
Geo p.a.e.	0.033	0.029	0.027	0.025	0.024	0.023	0.021	0.020	0.019	0.019	0.023	0.022	0.020	0.019	0.019
Rel p.a.e.	0.425	0.379	0.347	0.324	0.306	0.297	0.276	0.261	0.249	0.241	0.301	0.277	0.261	0.249	0.240

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	66	88	110	132	154	330	440	550	660	770					
1st Year						0.012	0.010	0.009	0.008	0.008	0.012	0.010	0.009	0.008	0.008
2nd Year						0.015	0.014	0.013	0.012	0.012	0.015	0.014	0.013	0.012	0.012
3rd Year						0.017	0.016	0.016	0.015	0.015	0.017	0.016	0.016	0.015	0.015
4th Year	0.026	0.023	0.020	0.019	0.017	0.019	0.019	0.018	0.018	0.017	0.021	0.019	0.018	0.018	0.017
5th Year	0.028	0.024	0.022	0.021	0.019	0.021	0.021	0.020	0.020	0.020	0.023	0.021	0.020	0.020	0.019
6th Year	0.029	0.026	0.024	0.023	0.021	0.023	0.022	0.022	0.022	0.021	0.024	0.023	0.022	0.022	0.021
Geo p.a.e.	0.028	0.024	0.022	0.021	0.019	0.018	0.016	0.016	0.015	0.015	0.018	0.017	0.016	0.015	0.015
Rel p.a.e.	0.356	0.314	0.285	0.264	0.247	0.225	0.210	0.201	0.193	0.188	0.232	0.214	0.202	0.194	0.188

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #7A - Number of students per FTE teacher. (public schools)

[Model 3A] (Pooled Mean = 14.882, Estim Std Dev = 3.981, Avg D = 0.223)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.250	0.217	0.194	0.177	0.164	0.250	0.217	0.194	0.177	0.164
2nd Year						0.429	0.395	0.372	0.356	0.342	0.429	0.395	0.372	0.356	0.342
3rd Year						0.503	0.469	0.446	0.430	0.416	0.503	0.469	0.446	0.430	0.416
4th Year	0.560	0.485	0.433	0.396	0.366	0.560	0.526	0.503	0.486	0.473	0.560	0.519	0.492	0.472	0.457
5th Year	0.738	0.663	0.612	0.574	0.545	0.607	0.574	0.551	0.534	0.521	0.631	0.590	0.562	0.541	0.525
6th Year	0.812	0.737	0.686	0.648	0.619	0.650	0.616	0.593	0.576	0.563	0.679	0.638	0.610	0.589	0.573
Geo p.a.e.	0.695	0.619	0.567	0.528	0.498	0.478	0.442	0.418	0.399	0.385	0.485	0.446	0.419	0.400	0.384
Rel p.a.e.	0.047	0.042	0.038	0.035	0.033	0.032	0.030	0.028	0.027	0.026	0.033	0.030	0.028	0.027	0.026

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.250	0.217	0.194	0.177	0.164	0.250	0.217	0.194	0.177	0.164
2nd Year						0.307	0.281	0.264	0.251	0.242	0.307	0.281	0.264	0.251	0.242
3rd Year						0.356	0.333	0.318	0.308	0.301	0.356	0.333	0.318	0.308	0.301
4th Year	0.560	0.485	0.433	0.396	0.366	0.398	0.378	0.365	0.356	0.350	0.429	0.398	0.377	0.363	0.353
5th Year	0.587	0.516	0.469	0.434	0.408	0.436	0.418	0.406	0.399	0.393	0.465	0.436	0.417	0.405	0.395
6th Year	0.614	0.546	0.502	0.469	0.445	0.471	0.454	0.444	0.437	0.432	0.498	0.471	0.454	0.442	0.434
Geo p.a.e.	0.587	0.515	0.467	0.432	0.405	0.362	0.337	0.320	0.308	0.299	0.374	0.344	0.324	0.310	0.300
Rel p.a.e.	0.039	0.035	0.031	0.029	0.027	0.024	0.023	0.021	0.021	0.020	0.025	0.023	0.022	0.021	0.020

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #8A - Percentage of schools in which various programs and services were available. (public schools)

[Model 3A] (Pooled Mean = 0.997, Estim Std Dev = 0.052, Avg D = 0.001)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002
2nd Year						0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.003	0.003
3rd Year						0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
4th Year	0.007	0.006	0.006	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.006	0.005	0.005	0.004	0.004
5th Year	0.008	0.007	0.007	0.006	0.006	0.005	0.005	0.005	0.005	0.004	0.006	0.006	0.005	0.005	0.005
6th Year	0.009	0.008	0.007	0.007	0.006	0.006	0.005	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005
Geo p.a.e.	0.008	0.007	0.007	0.006	0.006	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
Rel p.a.e.	0.008	0.007	0.007	0.006	0.006	0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002
2nd Year						0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.002
3rd Year						0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
4th Year	0.007	0.006	0.006	0.005	0.005	0.004	0.003	0.003	0.003	0.003	0.005	0.004	0.004	0.003	0.003
5th Year	0.007	0.006	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.005	0.004	0.004	0.004	0.003
6th Year	0.008	0.007	0.006	0.005	0.005	0.004	0.004	0.004	0.003	0.003	0.005	0.004	0.004	0.004	0.004
Geo p.a.e.	0.007	0.006	0.006	0.005	0.005	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.003
Rel p.a.e.	0.007	0.006	0.006	0.005	0.005	0.004	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.003

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #9 - Percentage of principals having master's degree. (public schools)

[Model 3A] (Pooled Mean = 0.977, Estim Std Dev = 0.148, Avg D = 0.004)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
2nd Year						0.013	0.012	0.011	0.010	0.010	0.013	0.012	0.011	0.010	0.010
3rd Year						0.014	0.013	0.012	0.012	0.011	0.014	0.013	0.012	0.012	0.011
4th Year	0.021	0.018	0.016	0.015	0.014	0.016	0.014	0.013	0.013	0.012	0.017	0.015	0.014	0.013	0.013
5th Year	0.024	0.022	0.020	0.018	0.017	0.016	0.015	0.014	0.014	0.013	0.018	0.016	0.015	0.015	0.014
6th Year	0.026	0.023	0.021	0.020	0.019	0.017	0.016	0.015	0.015	0.014	0.019	0.017	0.016	0.016	0.015
Geo p.a.e.	0.024	0.021	0.019	0.017	0.016	0.014	0.013	0.012	0.011	0.011	0.015	0.013	0.012	0.012	0.011
Rel p.a.e.	0.024	0.021	0.019	0.018	0.017	0.014	0.013	0.012	0.011	0.011	0.015	0.014	0.013	0.012	0.011

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	32	43	54	65	76	162	216	270	324	378					
1st Year						0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
2nd Year						0.010	0.009	0.008	0.007	0.007	0.010	0.009	0.008	0.007	0.007
3rd Year						0.011	0.010	0.009	0.008	0.008	0.011	0.010	0.009	0.008	0.008
4th Year	0.021	0.018	0.016	0.015	0.014	0.011	0.010	0.010	0.009	0.009	0.013	0.012	0.011	0.010	0.010
5th Year	0.021	0.018	0.017	0.015	0.014	0.012	0.011	0.010	0.010	0.009	0.014	0.012	0.011	0.011	0.010
6th Year	0.021	0.019	0.017	0.016	0.015	0.012	0.011	0.011	0.010	0.010	0.014	0.013	0.012	0.011	0.011
Geo p.a.e.	0.021	0.018	0.017	0.015	0.014	0.011	0.010	0.009	0.008	0.008	0.012	0.010	0.010	0.009	0.008
Rel p.a.e.	0.022	0.019	0.017	0.016	0.014	0.011	0.010	0.009	0.009	0.008	0.012	0.011	0.010	0.009	0.009

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #10A - Percentage of full time teachers who received various types of compensation. (public schools)

[Model 3A] (Pooled Mean = 0.413, Estim Std Dev = 0.492, Avg D = 0.006)

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	175	234	292	350	409	876	1,168	1,460	1,752	2,044					
1st Year						0.013	0.012	0.010	0.009	0.009	0.013	0.012	0.010	0.009	0.009
2nd Year						0.018	0.017	0.015	0.015	0.014	0.018	0.017	0.015	0.015	0.014
3rd Year						0.021	0.019	0.018	0.017	0.016	0.021	0.019	0.018	0.017	0.016
4th Year	0.030	0.026	0.023	0.021	0.019	0.022	0.020	0.019	0.018	0.018	0.024	0.021	0.020	0.019	0.018
5th Year	0.035	0.031	0.028	0.026	0.025	0.024	0.022	0.021	0.020	0.019	0.026	0.024	0.022	0.021	0.020
6th Year	0.037	0.033	0.030	0.028	0.027	0.025	0.023	0.022	0.021	0.020	0.027	0.025	0.024	0.022	0.022
Geo p.a.e.	0.034	0.030	0.027	0.025	0.023	0.020	0.018	0.017	0.016	0.015	0.021	0.019	0.018	0.017	0.016
Rel p.a.e.	0.082	0.072	0.065	0.061	0.057	0.049	0.044	0.041	0.039	0.037	0.051	0.046	0.042	0.040	0.038

[Model 4M]

	State portion of National Conducted 3 yrs after All States					State portion of All States Periodicity = 6 Years					State composite "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	175	234	292	350	409	876	1,168	1,460	1,752	2,044					
1st Year						0.013	0.012	0.010	0.009	0.009	0.013	0.012	0.010	0.009	0.009
2nd Year						0.014	0.013	0.012	0.011	0.010	0.014	0.013	0.012	0.011	0.010
3rd Year						0.015	0.014	0.013	0.012	0.011	0.015	0.014	0.013	0.012	0.011
4th Year	0.030	0.026	0.023	0.021	0.019	0.016	0.015	0.014	0.013	0.013	0.019	0.017	0.016	0.015	0.014
5th Year	0.030	0.026	0.024	0.022	0.020	0.017	0.015	0.015	0.014	0.014	0.020	0.018	0.016	0.016	0.015
6th Year	0.031	0.027	0.024	0.022	0.021	0.018	0.016	0.016	0.015	0.014	0.020	0.018	0.017	0.016	0.016
Geo p.a.e.	0.030	0.026	0.024	0.022	0.020	0.015	0.014	0.013	0.012	0.012	0.017	0.015	0.014	0.013	0.012
Rel p.a.e.	0.073	0.064	0.057	0.052	0.049	0.037	0.034	0.031	0.030	0.028	0.041	0.036	0.033	0.031	0.029

Projected Absolute Errors (State) -- Interleaved 3-6-9 Design

Item #11A - % of full time teachers newly hired and who were first time teachers. (public schools)

[Model 3A] **(Pooled Mean = 0.021, Estim Std Dev = 0.144, Avg D = 0.006)**

	State portion of National **Conducted 3 yrs after All States**					State portion of All States **Periodicity = 6 Years**					State composite **"Interleaved"**				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	175	234	292	350	409	876	1,168	1,460	1,752	2,044					
1st Year						0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
2nd Year						0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.008	0.007	0.007
3rd Year						0.011	0.010	0.010	0.009	0.009	0.011	0.010	0.010	0.009	0.009
4th Year	0.009	0.008	0.007	0.006	0.006	0.012	0.012	0.011	0.011	0.011	0.012	0.011	0.011	0.010	0.010
5th Year	0.013	0.012	0.011	0.011	0.010	0.013	0.013	0.012	0.012	0.012	0.013	0.013	0.012	0.012	0.012
6th Year	0.015	0.014	0.013	0.013	0.012	0.014	0.014	0.014	0.013	0.013	0.015	0.014	0.014	0.013	0.013
Geo p.a.e.	0.012	0.011	0.010	0.010	0.009	0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008
Rel p.a.e.	0.570	0.513	0.474	0.445	0.423	0.453	0.426	0.406	0.392	0.380	0.451	0.422	0.402	0.386	0.374

[Model 4M]

	State portion of National **Conducted 3 yrs after All States**					State portion of All States **Periodicity = 6 Years**					State composite **"Interleaved"**				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	175	234	292	350	409	876	1,168	1,460	1,752	2,044					
1st Year						0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003
2nd Year						0.006	0.006	0.006	0.005	0.005	0.006	0.006	0.006	0.005	0.005
3rd Year						0.008	0.007	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
4th Year	0.009	0.008	0.007	0.006	0.006	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.008	0.008	0.008
5th Year	0.010	0.009	0.008	0.008	0.007	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009
6th Year	0.011	0.010	0.010	0.009	0.009	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Geo p.a.e.	0.010	0.009	0.008	0.008	0.007	0.008	0.007	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
Rel p.a.e.	0.460	0.411	0.378	0.355	0.336	0.355	0.339	0.327	0.319	0.313	0.354	0.336	0.323	0.314	0.307

Part II – Error Projections for Selected Models, Policy Variables, Cost Ratios, and Periodicities

Appendix C

Projected Absolute Errors for Large-Sample Scenarios with Periodicities of 4, 5, and 6 Years

Private Schools: National-level U.S.

SASS Results, Estimates, and Projected Absolute Errors (U.S.) Private Schools
Large-Sample Scenarios for Periodicities of 4, 5, or 6 Years
under Models 1, 2A, 3A, 4M

[SASS Results] [Estimates]

Item	Source	1987 - 88 N*	1987 - 88 N	1987 - 88 Mean	1987 - 88 Std Dev	1990 - 91 N*	1990 - 91 N	1990 - 91 Mean	1990 - 91 Std Dev	1993 - 94 N*	1993 - 94 N	1993 - 94 Mean	1993 - 94 Std Dev	Pooled Mean	Estim Std Dev	Avg D
#1	School (Pub)	8,326	4,659	94.527	128.412	8,969	5,458	101.586	150.210	8,767	4,787	117.660	169.070	104.591	150.153	3.855
#4	School (Pub)	8,326	8,326	2.952	4.155	8,969	8,969	3.477	3.839					3.214	4.000	0.175
#6	Adminr (Pub & Pri)	10,955	10,955	0.088	0.284	11,811	11,811	0.091	0.287	11,841	11,841	0.105	0.306	0.095	0.292	0.003
#7A	School (Pub)	8,326	8,326	17.540	5.101	8,969	8,825	16.512	5.666	8,767	8,551	16.884	5.052	16.979	5.280	0.234
#7B	School (Pri)	2,459	2,459	15.793	7.343	2,620	2,505	14.749	6.543	2,585	2,426	16.480	30.485	15.674	18.494	0.463
#8A	School (Pub)	8,326	8,326	0.993	0.081	8,969	8,969	0.991	0.092	8,767	8,767	0.994	0.080	0.993	0.084	0.001
#8B	School (Pri)	2,459	2,459	0.838	0.368	2,620	2,620	0.844	0.363	2,585	2,585	0.841	0.365	0.841	0.366	0.001
#9	Adminr (Pub)	8,519	8,519	0.955	0.207	9,054	9,054	0.979	0.145	9,098	9,098	0.981	0.136	0.972	0.166	0.004
#10A	Teacher (Pub)	40,593	40,593	0.351	0.477	46,705	46,705	0.396	0.489	47,105	47,105	0.410	0.492	0.386	0.486	0.010
#10B	Teacher (Pri)	6,764	6,764	0.212	0.409	6,642	6,642	0.301	0.459	8,372	8,372	0.295	0.456	0.269	0.442	0.016
#11A	Teacher (Pub)	40,593	40,593	0.034	0.182	46,705	46,705	0.032	0.175	47,105	47,105	0.036	0.186	0.034	0.181	0.001
#11B	Teacher (Pri)	6,764	6,764	0.079	0.270	6,642	6,642	0.057	0.232	8,372	8,372	0.057	0.232	0.065	0.246	0.004

* denotes actual sample size.

Private schools -- national-level only

[Projected Absolute Errors]

Item	Source	Ref N	Rel p.a.e. Mod 1 p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 2A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 3A p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs	Rel p.a.e. Mod 4M p=0.5 -- Periodicity -- 4 yrs	5 yrs	6 yrs
#1	School (Pub)													
#4	School (Pub)													
#6	Adminr (Pub & Pri)													
#7A	School (Pub)													
#7B	School (Pri)	2,500	0.065	0.078	0.091	0.034	0.037	0.041	0.046	0.048	0.050	0.035	0.037	0.039
#8A	School (Pub)													
#8B	School (Pri)	2,500	0.010	0.010	0.010	0.004	0.004	0.005	0.009	0.009	0.008	0.008	0.007	0.007
#9	Adminr (Pub)													
#10A	Teacher (Pub)													
#10B	Teacher (Pri)	8,000	0.105	0.133	0.161	0.058	0.064	0.073	0.065	0.073	0.079	0.055	0.062	0.069
#11A	Teacher (Pub)													
#11B	Teacher (Pri)	8,000	0.124	0.149	0.174	0.064	0.070	0.079	0.086	0.090	0.095	0.065	0.070	0.075
Avg			0.054	0.063	0.072	0.027	0.029	0.032	0.039	0.040	0.042	0.031	0.033	0.034

Projected Absolute Errors (US)

Item #7B - Number of students per FTE teacher. (private schools)
(Pooled Mean = 15.674, Estim Std Dev = 18.494, Avg D = 0.463)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.427	0.370	0.331	0.302	0.280	0.382	0.331	0.296	0.270	0.250	0.349	0.302	0.270	0.247	0.228
2nd Year	0.890	0.833	0.793	0.765	0.742	0.845	0.793	0.759	0.733	0.713	0.811	0.765	0.733	0.709	0.691
3rd Year	1.352	1.295	1.256	1.227	1.205	1.307	1.256	1.221	1.195	1.175	1.274	1.227	1.195	1.172	1.154
4th Year	1.815	1.758	1.719	1.690	1.668	1.770	1.719	1.684	1.658	1.638	1.737	1.690	1.658	1.635	1.616
5th Year						2.233	2.181	2.147	2.121	2.101	2.199	2.153	2.121	2.097	2.079
6th Year											2.662	2.615	2.583	2.560	2.542
Avg p.a.e.	1.121	1.064	1.025	0.996	0.974	1.307	1.256	1.221	1.195	1.175	1.505	1.459	1.427	1.403	1.385
Rel p.a.e.	0.072	0.068	0.065	0.064	0.062	0.083	0.080	0.078	0.076	0.075	0.096	0.093	0.091	0.090	0.088

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.427	0.370	0.331	0.302	0.280	0.382	0.331	0.296	0.270	0.250	0.349	0.302	0.270	0.247	0.228
2nd Year	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463
3rd Year	0.676	0.648	0.628	0.614	0.602	0.654	0.628	0.611	0.598	0.588	0.637	0.614	0.598	0.586	0.577
4th Year	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694	0.694
5th Year						0.837	0.818	0.805	0.795	0.788	0.825	0.807	0.795	0.786	0.780
6th Year											1.129	1.094	1.070	1.052	1.039
Avg p.a.e.	0.565	0.544	0.529	0.518	0.510	0.606	0.587	0.574	0.564	0.556	0.683	0.662	0.648	0.638	0.630
Rel p.a.e.	0.036	0.035	0.034	0.033	0.033	0.039	0.037	0.037	0.036	0.036	0.044	0.042	0.041	0.041	0.040

Projected Absolute Errors (US)

Item #7B - Number of students per FTE teacher. (private schools)
(Pooled Mean = 15.674, Estim Std Dev = 18.494, Avg D = 0.463)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.427	0.370	0.331	0.302	0.280	0.382	0.331	0.296	0.270	0.250	0.349	0.302	0.270	0.247	0.228
2nd Year	0.797	0.740	0.701	0.672	0.650	0.752	0.701	0.666	0.640	0.620	0.719	0.672	0.640	0.617	0.598
3rd Year	0.951	0.893	0.854	0.825	0.803	0.905	0.854	0.819	0.794	0.774	0.872	0.825	0.794	0.770	0.752
4th Year	1.068	1.011	0.972	0.943	0.921	1.023	0.972	0.937	0.911	0.891	0.990	0.943	0.911	0.888	0.869
5th Year						1.122	1.071	1.036	1.010	0.990	1.089	1.042	1.010	0.987	0.969
6th Year											1.176	1.130	1.098	1.074	1.056
Avg p.a.e.	0.811	0.754	0.714	0.686	0.663	0.837	0.786	0.751	0.725	0.705	0.866	0.819	0.787	0.764	0.745
Rel p.a.e.	0.052	0.048	0.046	0.044	0.042	0.053	0.050	0.048	0.046	0.045	0.055	0.052	0.050	0.049	0.048

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.427	0.370	0.331	0.302	0.280	0.382	0.331	0.296	0.270	0.250	0.349	0.302	0.270	0.247	0.228
2nd Year	0.565	0.523	0.496	0.478	0.464	0.532	0.496	0.474	0.458	0.447	0.509	0.478	0.458	0.445	0.435
3rd Year	0.676	0.641	0.619	0.604	0.593	0.648	0.619	0.601	0.589	0.580	0.629	0.604	0.589	0.579	0.571
4th Year	0.770	0.740	0.721	0.709	0.699	0.746	0.721	0.706	0.696	0.688	0.730	0.709	0.696	0.687	0.681
5th Year						0.833	0.811	0.797	0.788	0.781	0.818	0.799	0.788	0.780	0.775
6th Year											0.898	0.881	0.871	0.864	0.859
Avg p.a.e.	0.610	0.569	0.542	0.523	0.509	0.628	0.596	0.575	0.560	0.549	0.655	0.629	0.612	0.600	0.591
Rel p.a.e.	0.039	0.036	0.035	0.033	0.032	0.040	0.038	0.037	0.036	0.035	0.042	0.040	0.039	0.038	0.038

Projected Absolute Errors (US)

Item #8B - Percentage of schools in which various programs and services were available to students. (private schools)
(Pooled Mean = 0.841, Estim Std Dev = 0.366, Avg D = 0.001)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.008	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
2nd Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
3rd Year	0.011	0.010	0.009	0.009	0.008	0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.008	0.008	0.007
4th Year	0.012	0.011	0.011	0.010	0.010	0.012	0.011	0.010	0.009	0.009	0.011	0.010	0.009	0.009	0.009
5th Year						0.013	0.012	0.011	0.011	0.010	0.012	0.011	0.011	0.010	0.010
6th Year											0.014	0.013	0.012	0.012	0.011
Avg p.a.e.	0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008	0.010	0.009	0.009	0.008	0.008
Rel p.a.e.	0.012	0.011	0.010	0.009	0.009	0.012	0.011	0.010	0.010	0.009	0.012	0.011	0.010	0.010	0.009

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.008	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
2nd Year	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3rd Year	0.006	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
4th Year	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
5th Year						0.005	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004
6th Year											0.008	0.007	0.007	0.006	0.006
Avg p.a.e.	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.003	0.003	0.005	0.004	0.004	0.004	0.004
Rel p.a.e.	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.004	0.005	0.005	0.005	0.004	0.004

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Projected Absolute Errors (US)

item #8B - Percentage of schools in which various programs and services were available to students. (private schools)
(Pooled Mean = 0.841, Estim Std Dev = 0.366, Avg D = 0.001)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.008	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
2nd Year	0.010	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.006
3rd Year	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
4th Year	0.010	0.009	0.008	0.008	0.007	0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006
5th Year						0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.007
6th Year											0.009	0.008	0.008	0.007	0.007
Avg p.a.e.	0.010	0.008	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006
Rel p.a.e.	0.011	0.010	0.009	0.008	0.008	0.011	0.009	0.009	0.008	0.007	0.010	0.009	0.008	0.008	0.007

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	1,200	1,600	2,000	2,400	2,800	1,500	2,000	2,500	3,000	3,500	1,800	2,400	3,000	3,600	4,200
1st Year	0.008	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
2nd Year	0.009	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.005	0.005	0.007	0.006	0.005	0.005	0.005
3rd Year	0.009	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005
4th Year	0.009	0.008	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005
5th Year						0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005
6th Year											0.007	0.006	0.006	0.005	0.005
Avg p.a.e.	0.009	0.007	0.007	0.006	0.006	0.008	0.007	0.006	0.006	0.005	0.007	0.006	0.006	0.005	0.005
Rel p.a.e.	0.010	0.009	0.008	0.007	0.007	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.006	0.006

Projected Absolute Errors (US)

Item #10B - Percentage of full time teachers who received various types of compensation. (private schools)
(Pooled Mean = 0.269, Estim Std Dev = 0.442, Avg D = 0.016)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.022	0.021	0.020	0.020	0.020	0.021	0.020	0.020	0.019	0.019	0.021	0.020	0.019	0.019	0.019
3rd Year	0.037	0.037	0.036	0.036	0.035	0.037	0.036	0.036	0.035	0.035	0.036	0.036	0.035	0.035	0.035
4th Year	0.053	0.053	0.052	0.052	0.051	0.053	0.052	0.052	0.051	0.051	0.052	0.052	0.051	0.051	0.051
5th Year						0.069	0.068	0.067	0.067	0.067	0.068	0.068	0.067	0.067	0.067
6th Year											0.084	0.083	0.083	0.083	0.082
Avg p.a.e.	0.030	0.029	0.028	0.028	0.028	0.037	0.036	0.036	0.035	0.035	0.044	0.044	0.043	0.043	0.043
Rel p.a.e.	0.110	0.107	0.105	0.103	0.102	0.137	0.134	0.133	0.131	0.130	0.165	0.162	0.161	0.160	0.159

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
3rd Year	0.019	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.017
4th Year	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
5th Year						0.026	0.025	0.025	0.025	0.025	0.026	0.025	0.025	0.025	0.025
6th Year											0.033	0.033	0.032	0.032	0.032
Avg p.a.e.	0.016	0.016	0.016	0.015	0.015	0.018	0.018	0.017	0.017	0.017	0.020	0.020	0.020	0.020	0.020
Rel p.a.e.	0.060	0.058	0.058	0.057	0.057	0.066	0.065	0.064	0.064	0.064	0.075	0.074	0.073	0.073	0.072

Projected Absolute Errors (US)

Item #10B - Percentage of full time teachers who received various types of compensation. (private schools)
(Pooled Mean = 0.269, Estim Std Dev = 0.442, Avg D = 0.016)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.018	0.018	0.017	0.017	0.016	0.018	0.017	0.017	0.016	0.016	0.017	0.017	0.016	0.016	0.016
3rd Year	0.024	0.023	0.022	0.022	0.022	0.023	0.022	0.022	0.022	0.021	0.023	0.022	0.022	0.021	0.021
4th Year	0.028	0.027	0.026	0.026	0.026	0.027	0.026	0.026	0.026	0.025	0.027	0.026	0.026	0.025	0.025
5th Year						0.030	0.030	0.029	0.029	0.029	0.030	0.029	0.029	0.029	0.028
6th Year											0.033	0.032	0.032	0.032	0.031
Avg p.a.e.	0.019	0.018	0.018	0.017	0.017	0.021	0.020	0.020	0.019	0.019	0.022	0.022	0.021	0.021	0.021
Rel p.a.e.	0.070	0.067	0.065	0.064	0.063	0.077	0.074	0.073	0.071	0.070	0.083	0.081	0.079	0.078	0.077

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.003	0.003
2nd Year	0.014	0.014	0.013	0.013	0.013	0.014	0.013	0.013	0.013	0.013	0.014	0.013	0.013	0.013	0.013
3rd Year	0.019	0.019	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018
4th Year	0.023	0.023	0.022	0.022	0.022	0.023	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
5th Year						0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
6th Year											0.029	0.029	0.029	0.029	0.029
Avg p.a.e.	0.015	0.015	0.015	0.015	0.014	0.017	0.017	0.017	0.017	0.017	0.019	0.019	0.019	0.019	0.018
Rel p.a.e.	0.057	0.055	0.055	0.054	0.053	0.064	0.063	0.062	0.062	0.061	0.070	0.070	0.069	0.069	0.068

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Projected Absolute Errors (US)

Item #11B - Percentage of full time teachers who were newly hired and who were first time teachers. (private teachers)
(Pooled Mean = 0.065, Estim Std Dev = 0.246, Avg D = 0.004)

[Model 1]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.007	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005
3rd Year	0.011	0.010	0.010	0.010	0.009	0.010	0.010	0.010	0.009	0.009	0.010	0.010	0.009	0.009	0.009
4th Year	0.014	0.014	0.014	0.013	0.013	0.014	0.014	0.013	0.013	0.013	0.014	0.013	0.013	0.013	0.013
5th Year						0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
6th Year											0.021	0.021	0.021	0.020	0.020
Avg p.a.e.	0.009	0.008	0.008	0.008	0.008	0.010	0.010	0.010	0.009	0.009	0.012	0.012	0.011	0.011	0.011
Rel p.a.e.	0.135	0.128	0.124	0.121	0.118	0.158	0.153	0.149	0.146	0.143	0.183	0.178	0.174	0.172	0.169

[Model 2A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
3rd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4th Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
5th Year						0.007	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006
6th Year											0.009	0.009	0.008	0.008	0.008
Avg p.a.e.	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.005	0.005	0.005
Rel p.a.e.	0.069	0.066	0.064	0.063	0.062	0.074	0.072	0.070	0.069	0.068	0.083	0.081	0.079	0.078	0.077

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Projected Absolute Errors (US)

Item #11B - Percentage of full time teachers who were newly hired and who were first time teachers. (private teachers)
(Pooled Mean = 0.065, Estim Std Dev = 0.246, Avg D = 0.004)

[Model 3A]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.006	0.006	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005
3rd Year	0.007	0.007	0.007	0.006	0.006	0.007	0.007	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006
4th Year	0.008	0.008	0.008	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.008	0.007	0.007	0.007	0.007
5th Year						0.009	0.008	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.008
6th Year											0.009	0.009	0.009	0.008	0.008
Avg p.a.e.	0.006	0.006	0.006	0.005	0.005	0.006	0.006	0.006	0.006	0.005	0.007	0.006	0.006	0.006	0.006
Rel p.a.e.	0.097	0.090	0.086	0.082	0.080	0.100	0.094	0.090	0.087	0.085	0.104	0.099	0.095	0.092	0.090

[Model 4M]

	Periodicity = 4 Years					Periodicity = 5 Years					Periodicity = 6 Years				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	3,840	5,120	6,400	7,680	8,960	4,800	6,400	8,000	9,600	11,200	5,760	7,680	9,600	11,520	13,440
1st Year	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.003	0.003
3rd Year	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4th Year	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.006	0.006	0.006	0.005	0.005
5th Year						0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
6th Year											0.007	0.007	0.007	0.007	0.007
Avg p.a.e.	0.005	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.005	0.005	0.005
Rel p.a.e.	0.073	0.068	0.065	0.063	0.062	0.076	0.072	0.070	0.068	0.067	0.079	0.076	0.075	0.073	0.072

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Part II – Error Projections for Selected Models, Policy Variables, Cost Ratios, and Periodicities

Appendix D

Projected Absolute Errors for an Alternating Large-and-Small-Sample Design ("Interleaved 3-6-9 Design") with Selected Periodicities

Private Schools: National-level U.S.

SASS Results, Estimates, and Projected Absolute Errors (U.S.) Private Schools
Alternating Large-and-Small-Sample Design: Interleaved 3-6-9
under Models 3A and 4M

[SASS Results]

Item	Source	1987 - 88				1990 - 91				1993 - 94			
		N*	N	Mean	Std Dev	N*	N	Mean	Std Dev	N*	N	Mean	Std Dev
#1	School (Pub)	8,326	4,659	94.527	128.412	8,969	5,458	101.586	150.210	8,767	4,787	117.660	169.070
#4	School (Pub)	8,326	8,326	2.952	4.155	8,969	8,969	3.477	3.839				
#6	Adminr (Pub & Pri)	10,955	10,955	0.088	0.284	11,811	11,811	0.091	0.287	11,841	11,841	0.105	0.306
#7A	School (Pub)	8,326	8,326	17.540	5.101	8,969	8,825	16.512	5.666	8,767	8,551	16.884	5.052
#7B	School (Pri)	2,459	2,459	15.793	7.343	2,620	2,505	14.749	6.543	2,585	2,426	16.480	30.485
#8A	School (Pub)	8,326	8,326	0.993	0.081	8,969	8,969	0.991	0.092	8,767	8,767	0.994	0.080
#8B	School (Pri)	2,459	2,459	0.838	0.368	2,620	2,620	0.844	0.363	2,585	2,585	0.841	0.365
#9	Adminr (Pub)	8,519	8,519	0.955	0.207	9,054	9,054	0.979	0.145	9,098	9,098	0.981	0.136
#10A	Teacher (Pub)	40,593	40,593	0.351	0.477	46,705	46,705	0.396	0.489	47,105	47,105	0.410	0.492
#10B	Teacher (Pri)	6,764	6,764	0.212	0.409	6,642	6,642	0.301	0.459	8,372	8,372	0.295	0.456
#11A	Teacher (Pub)	40,593	40,593	0.034	0.182	46,705	46,705	0.032	0.175	47,105	47,105	0.036	0.186
#11B	Teacher (Pri)	6,764	6,764	0.079	0.270	6,642	6,642	0.057	0.232	8,372	8,372	0.057	0.232

* denotes actual sample size.

[Estimates]

Item	Source	Pooled Mean	Estim Std Dev	Avg D	Ref N
#1	School (Pub)				
#4	School (Pub)				
#6	Adminr (Pub & Pri)				
#7A	School (Pub)				
#7B	School (Pri)	15.674	18.494	0.463	2,500
#8A	School (Pub)				
#8B	School (Pri)	0.841	0.366	0.001	2,500
#9	Adminr (Pub)				
#10A	Teacher (Pub)				
#10B	Teacher (Pri)	0.269	0.442	0.016	8,000
#11A	Teacher (Pub)				
#11B	Teacher (Pri)	0.065	0.246	0.004	8,000

[Projected] National composite [Interleaved 3-6-9]

Item	Rel p.a.e. Mod 3A Cost Ratio			Rel p.a.e. Mod 4M Cost Ratio		
	0.3	0.5	0.7	0.3	0.5	0.7
#1						
#4						
#6						
#7A						
#7B	0.054	0.045	0.041	0.044	0.037	0.033
#8A						
#8B	0.015	0.011	0.010	0.014	0.011	0.009
#9						
#10A						
#10B	0.059	0.052	0.047	0.049	0.044	0.041
#11A						
#11B	0.100	0.084	0.075	0.081	0.068	0.061
Avg	0.046	0.039	0.035	0.039	0.033	0.029

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Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #7B - Number of students per FTE teacher. (private schools)

[Model 3A] (Pooled Mean = 15.674, Estim Std Dev = 18.494, Avg D = 0.463)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	300	400	500	600	700	1,500	2,000	2,500	3,000	3,500					
1st Year						0.382	0.331	0.296	0.270	0.250	0.382	0.331	0.296	0.270	0.250
2nd Year						0.752	0.701	0.666	0.640	0.620	0.752	0.701	0.666	0.640	0.620
3rd Year						0.905	0.854	0.819	0.794	0.774	0.905	0.854	0.819	0.794	0.774
4th Year	0.854	0.740	0.662	0.604	0.559	1.023	0.972	0.937	0.911	0.891	0.854	0.740	0.662	0.604	0.559
5th Year	1.224	1.110	1.032	0.974	0.929	1.122	1.071	1.036	1.010	0.990	1.224	1.110	1.032	0.974	0.929
6th Year	1.378	1.263	1.185	1.127	1.083	1.210	1.158	1.124	1.098	1.078	1.378	1.263	1.185	1.127	1.083
Avg p.a.e.	1.129	1.012	0.932	0.872	0.826	0.844	0.788	0.749	0.719	0.696	0.849	0.768	0.712	0.671	0.638
Rel p.a.e.	0.072	0.065	0.059	0.056	0.053	0.054	0.050	0.048	0.046	0.044	0.054	0.049	0.045	0.043	0.041

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	300	400	500	600	700	1,500	2,000	2,500	3,000	3,500					
1st Year						0.382	0.331	0.296	0.270	0.250	0.382	0.331	0.296	0.270	0.250
2nd Year						0.532	0.496	0.474	0.458	0.447	0.532	0.496	0.474	0.458	0.447
3rd Year						0.648	0.619	0.601	0.589	0.580	0.648	0.619	0.601	0.589	0.580
4th Year	0.854	0.740	0.662	0.604	0.559	0.746	0.721	0.706	0.696	0.688	0.854	0.740	0.662	0.604	0.559
5th Year	0.931	0.827	0.758	0.708	0.671	0.833	0.811	0.797	0.788	0.781	0.931	0.827	0.758	0.708	0.671
6th Year	1.002	0.906	0.844	0.799	0.766	0.912	0.891	0.879	0.871	0.865	1.002	0.906	0.844	0.799	0.766
Avg p.a.e.	0.927	0.822	0.751	0.699	0.660	0.649	0.613	0.589	0.571	0.558	0.687	0.619	0.574	0.540	0.515
Rel p.a.e.	0.059	0.052	0.048	0.045	0.042	0.041	0.039	0.038	0.036	0.036	0.044	0.040	0.037	0.034	0.033

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #8B - Percentage of schools in which various programs and services were available. (private schools)

[Model 3A] (Pooled Mean = 0.841, Estim Std Dev = 0.366, Avg D = 0.001)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	300	400	500	600	700	1,500	2,000	2,500	3,000	3,500					
1st Year						0.008	0.007	0.006	0.005	0.005	0.008	0.007	0.006	0.005	0.005
2nd Year						0.009	0.008	0.007	0.006	0.006	0.009	0.008	0.007	0.006	0.006
3rd Year						0.009	0.008	0.007	0.007	0.006	0.009	0.008	0.007	0.007	0.006
4th Year	0.017	0.015	0.013	0.012	0.011	0.009	0.008	0.008	0.007	0.007	0.017	0.015	0.013	0.012	0.011
5th Year	0.018	0.016	0.014	0.013	0.012	0.010	0.009	0.008	0.007	0.007	0.018	0.016	0.014	0.013	0.012
6th Year	0.018	0.016	0.015	0.013	0.013	0.010	0.009	0.008	0.008	0.007	0.018	0.016	0.015	0.013	0.013
Avg p.a.e.	0.018	0.015	0.014	0.013	0.012	0.009	0.008	0.007	0.007	0.006	0.012	0.011	0.010	0.009	0.008
Rel p.a.e.	0.021	0.018	0.017	0.015	0.014	0.011	0.010	0.009	0.008	0.008	0.015	0.013	0.011	0.011	0.010

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	300	400	500	600	700	1,500	2,000	2,500	3,000	3,500					
1st Year						0.008	0.007	0.006	0.005	0.005	0.008	0.007	0.006	0.005	0.005
2nd Year						0.008	0.007	0.006	0.005	0.005	0.008	0.007	0.006	0.005	0.005
3rd Year						0.008	0.007	0.006	0.006	0.005	0.008	0.007	0.006	0.006	0.005
4th Year	0.017	0.015	0.013	0.012	0.011	0.008	0.007	0.006	0.006	0.005	0.017	0.015	0.013	0.012	0.011
5th Year	0.017	0.015	0.013	0.012	0.011	0.008	0.007	0.006	0.006	0.005	0.017	0.015	0.013	0.012	0.011
6th Year	0.017	0.015	0.013	0.012	0.011	0.008	0.007	0.006	0.006	0.005	0.017	0.015	0.013	0.012	0.011
Avg p.a.e.	0.017	0.015	0.013	0.012	0.011	0.008	0.007	0.006	0.006	0.005	0.011	0.010	0.009	0.008	0.007
Rel p.a.e.	0.020	0.017	0.016	0.014	0.013	0.009	0.008	0.007	0.007	0.006	0.014	0.012	0.011	0.010	0.009

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #10B - Percentage of full time teachers who received various types of compensation. (private schools)

[Model 3A] (Pooled Mean = 0.269, Estim Std Dev = 0.442, Avg D = 0.016)

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	960	1,280	1,600	1,920	2,240	4,800	6,400	8,000	9,600	11,200					
1st Year						0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.004	0.003
2nd Year						0.018	0.017	0.017	0.016	0.016	0.018	0.017	0.017	0.016	0.016
3rd Year						0.023	0.022	0.022	0.022	0.021	0.023	0.022	0.022	0.022	0.021
4th Year	0.011	0.010	0.009	0.008	0.007	0.027	0.026	0.026	0.026	0.025	0.011	0.010	0.009	0.008	0.007
5th Year	0.024	0.023	0.022	0.021	0.020	0.030	0.030	0.029	0.029	0.029	0.024	0.023	0.022	0.021	0.020
6th Year	0.029	0.028	0.027	0.026	0.025	0.033	0.033	0.032	0.032	0.032	0.029	0.028	0.027	0.026	0.025
Avg p.a.e.	0.020	0.018	0.017	0.016	0.016	0.020	0.019	0.018	0.018	0.017	0.016	0.015	0.014	0.013	0.013
Rel p.a.e.	0.075	0.068	0.064	0.061	0.058	0.073	0.070	0.067	0.066	0.064	0.059	0.055	0.052	0.049	0.047

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	960	1,280	1,600	1,920	2,240	4,800	6,400	8,000	9,600	11,200					
1st Year						0.005	0.004	0.004	0.004	0.003	0.005	0.004	0.004	0.004	0.003
2nd Year						0.014	0.013	0.013	0.013	0.013	0.014	0.013	0.013	0.013	0.013
3rd Year						0.019	0.018	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018
4th Year	0.011	0.010	0.009	0.008	0.007	0.023	0.022	0.022	0.022	0.022	0.011	0.010	0.009	0.008	0.007
5th Year	0.017	0.016	0.015	0.015	0.015	0.026	0.026	0.026	0.026	0.026	0.017	0.016	0.015	0.015	0.015
6th Year	0.021	0.020	0.020	0.020	0.019	0.029	0.029	0.029	0.029	0.029	0.021	0.020	0.020	0.020	0.019
Avg p.a.e.	0.016	0.015	0.014	0.013	0.013	0.017	0.016	0.016	0.016	0.015	0.013	0.012	0.012	0.011	0.011
Rel p.a.e.	0.060	0.055	0.052	0.050	0.048	0.062	0.060	0.059	0.058	0.057	0.049	0.046	0.044	0.042	0.041

Projected Absolute Errors (US) -- Interleaved 3-6-9 Design

Item #11B - % of full time teachers newly hired and who were first time teachers. (private schools)

[Model 3A] **(Pooled Mean = 0.065, Estim Std Dev = 0.246, Avg D = 0.004)**

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	960	1,280	1,600	1,920	2,240	4,800	6,400	8,000	9,600	11,200					
1st Year						0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year						0.006	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.005
3rd Year						0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.006	0.006	0.006
4th Year	0.006	0.005	0.005	0.004	0.004	0.008	0.008	0.007	0.007	0.007	0.006	0.005	0.005	0.004	0.004
5th Year	0.009	0.008	0.008	0.007	0.007	0.009	0.008	0.008	0.008	0.008	0.009	0.008	0.008	0.007	0.007
6th Year	0.011	0.010	0.009	0.009	0.008	0.009	0.009	0.009	0.009	0.008	0.011	0.010	0.009	0.009	0.008
Avg p.a.e.	0.009	0.008	0.007	0.007	0.006	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.005	0.005	0.005
Rel p.a.e.	0.132	0.119	0.109	0.102	0.097	0.101	0.094	0.090	0.086	0.084	0.100	0.090	0.084	0.079	0.075

[Model 4M]

	National only Conducted 3 yrs after All States					All States Periodicity = 6 Years					National "Interleaved"				
p	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7	0.3	0.4	0.5	0.6	0.7
N	960	1,280	1,600	1,920	2,240	4,800	6,400	8,000	9,600	11,200					
1st Year						0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
2nd Year						0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.003
3rd Year						0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4th Year	0.006	0.005	0.005	0.004	0.004	0.006	0.006	0.006	0.006	0.005	0.006	0.005	0.005	0.004	0.004
5th Year	0.007	0.006	0.006	0.005	0.005	0.007	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.005	0.005
6th Year	0.008	0.007	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.008	0.007	0.006	0.006	0.006
Avg p.a.e.	0.007	0.006	0.006	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.005	0.005	0.004	0.004	0.004
Rel p.a.e.	0.108	0.096	0.088	0.082	0.077	0.078	0.074	0.071	0.069	0.068	0.081	0.073	0.068	0.064	0.061

Listing of NCES Working Papers to Date

Please contact Ruth R. Harris at (202) 219-1831
if you are interested in any of the following papers

Number	Title	Contact
94-01 (July)	Schools and Staffing Survey (SASS) Papers Presented at Meetings of the American Statistical Association	Dan Kasprzyk
94-02 (July)	Generalized Variance Estimate for Schools and Staffing Survey (SASS)	Dan Kasprzyk
94-03 (July)	1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report	Dan Kasprzyk
94-04 (July)	The Accuracy of Teachers' Self-reports on their Postsecondary Education: Teacher Transcript Study, Schools and Staffing Survey	Dan Kasprzyk
94-05 (July)	Cost-of-Education Differentials Across the States	William Fowler
94-06 (July)	Six Papers on Teachers from the 1990-91 Schools and Staffing Survey and Other Related Surveys	Dan Kasprzyk
94-07 (Nov.)	Data Comparability and Public Policy: New Interest in Public Library Data Papers Presented at Meetings of the American Statistical Association	Carrol Kindel
95-01 (Jan.)	Schools and Staffing Survey: 1994 Papers Presented at the 1994 Meeting of the American Statistical Association	Dan Kasprzyk
95-02 (Jan.)	QED Estimates of the 1990-91 Schools and Staffing Survey: Deriving and Comparing QED School Estimates with CCD Estimates	Dan Kasprzyk
95-03 (Jan.)	Schools and Staffing Survey: 1990-91 SASS Cross-Questionnaire Analysis	Dan Kasprzyk
95-04 (Jan.)	National Education Longitudinal Study of 1988: Second Follow-up Questionnaire Content Areas and Research Issues	Jeffrey Owings
95-05 (Jan.)	National Education Longitudinal Study of 1988: Conducting Trend Analyses of NLS-72, HS&B, and NELS:88 Seniors	Jeffrey Owings

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Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
95-06 (Jan.)	National Education Longitudinal Study of 1988: Conducting Cross-Cohort Comparisons Using HS&B, NAEP, and NELS:88 Academic Transcript Data	Jeffrey Owings
95-07 (Jan.)	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
95-08 (Feb.)	CCD Adjustment to the 1990-91 SASS: A Comparison of Estimates	Dan Kasprzyk
95-09 (Feb.)	The Results of the 1993 Teacher List Validation Study (TLVS)	Dan Kasprzyk
95-10 (Feb.)	The Results of the 1991-92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation	Dan Kasprzyk
95-11 (Mar.)	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
95-12 (Mar.)	Rural Education Data User's Guide	Samuel Peng
95-13 (Mar.)	Assessing Students with Disabilities and Limited English Proficiency	James Houser
95-14 (Mar.)	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
95-15 (Apr.)	Classroom Instructional Processes: A Review of Existing Measurement Approaches and Their Applicability for the Teacher Follow-up Survey	Sharon Bobbitt
95-16 (Apr.)	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-17 (May)	Estimates of Expenditures for Private K-12 Schools	Stephen Broughman
95-18 (Nov.)	An Agenda for Research on Teachers and Schools: Revisiting NCES' Schools and Staffing Survey	Dan Kasprzyk
96-01 (Jan.)	Methodological Issues in the Study of Teachers' Careers: Critical Features of a Truly Longitudinal Study	Dan Kasprzyk

Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
96-02 (Feb.)	Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association	Dan Kasprzyk
96-03 (Feb.)	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
96-04 (Feb.)	Census Mapping Project/School District Data Book	Tai Phan
96-05 (Feb.)	Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey	Dan Kasprzyk
96-06 (Mar.)	The Schools and Staffing Survey (SASS) for 1998-99: Design Recommendations to Inform Broad Education Policy	Dan Kasprzyk
96-07 (Mar.)	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk
96-08 (Apr.)	How Accurate are Teacher Judgments of Students' Academic Performance?	Jerry West
96-09 (Apr.)	Making Data Relevant for Policy Discussions: Redesigning the School Administrator Questionnaire for the 1998-99 SASS	Dan Kasprzyk
96-10 (Apr.)	1998-99 Schools and Staffing Survey: Issues Related to Survey Depth	Dan Kasprzyk
96-11 (June)	Towards an Organizational Database on America's Schools: A Proposal for the Future of SASS, with comments on School Reform, Governance, and Finance	Dan Kasprzyk
96-12 (June)	Predictors of Retention, Transfer, and Attrition of Special and General Education Teachers: Data from the 1989 Teacher Followup Survey	Dan Kasprzyk
96-13 (June)	Estimation of Response Bias in the NHES:95 Adult Education Survey	Steven Kaufman
96-14 (June)	The 1995 National Household Education Survey: Reinterview Results for the Adult Education Component	Steven Kaufman

Listing of NCES Working Papers to Date--Continued

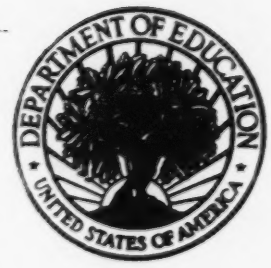
Number	Title	Contact
96-15 (June)	Nested Structures: District-Level Data in the Schools and Staffing Survey	Dan Kasprzyk
96-16 (June)	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
96-17 (July)	National Postsecondary Student Aid Study: 1996 Field Test Methodology Report	Andrew G. Malizio
96-18 (Aug.)	Assessment of Social Competence, Adaptive Behaviors, and Approaches to Learning with Young Children	Jerry West
96-19 (Oct.)	Assessment and Analysis of School-Level Expenditures	William Fowler
96-20 (Oct.)	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96-21 (Oct.)	1993 National Household Education Survey (NHES:93) Questionnaires: Screener, School Readiness, and School Safety and Discipline	Kathryn Chandler
96-22 (Oct.)	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
96-23 (Oct.)	Linking Student Data to SASS: Why, When, How	Dan Kasprzyk
96-24 (Oct.)	National Assessments of Teacher Quality	Dan Kasprzyk
96-25 (Oct.)	Measures of Inservice Professional Development: Suggested Items for the 1998-1999 Schools and Staffing Survey	Dan Kasprzyk
96-26 (Nov.)	Improving the Coverage of Private Elementary-Secondary Schools	Steven Kaufman
96-27 (Nov.)	Intersurvey Consistency in NCES Private School Surveys for 1993-94	Steven Kaufman

Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
96-28 (Nov.)	Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection	Mary Rollefson
96-29 (Nov.)	Undercoverage Bias in Estimates of Characteristics of Adults and 0- to 2-Year-Olds in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
96-30 (Dec.)	Comparison of Estimates from the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97-01 (Feb.)	Selected Papers on Education Surveys: Papers Presented at the 1996 Meeting of the American Statistical Association	Dan Kasprzyk
97-02 (Feb.)	Telephone Coverage Bias and Recorded Interviews in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-03 (Feb.)	1991 and 1995 National Household Education Survey Questionnaires: NHES:91 Screener, NHES:91 Adult Education, NHES:95 Basic Screener, and NHES:95 Adult Education	Kathryn Chandler
97-04 (Feb.)	Design, Data Collection, Monitoring, Interview Administration Time, and Data Editing in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-05 (Feb.)	Unit and Item Response, Weighting, and Imputation Procedures in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-06 (Feb.)	Unit and Item Response, Weighting, and Imputation Procedures in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97-07 (Mar.)	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97-08 (Mar.)	Design, Data Collection, Interview Timing, and Data Editing in the 1995 National Household Education Survey	Kathryn Chandler

Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
97-09 (Apr.)	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
97-10 (Apr.)	Report of Cognitive Research on the Public and Private School Teacher Questionnaires for the Schools and Staffing Survey 1993-94 School Year	Dan Kasprzyk
97-11 (Apr.)	International Comparisons of Inservice Professional Development	Dan Kasprzyk
97-12 (Apr.)	Measuring School Reform: Recommendations for Future SASS Data Collection	Mary Rollefson
97-13 (Apr.)	Improving Data Quality in NCES: Database-to-Report Process	Susan Ahmed
97-14 (Apr.)	Optimal Choice of Periodicities for the Schools and Staffing Survey: Modeling and Analysis	Steven Kaufman



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